

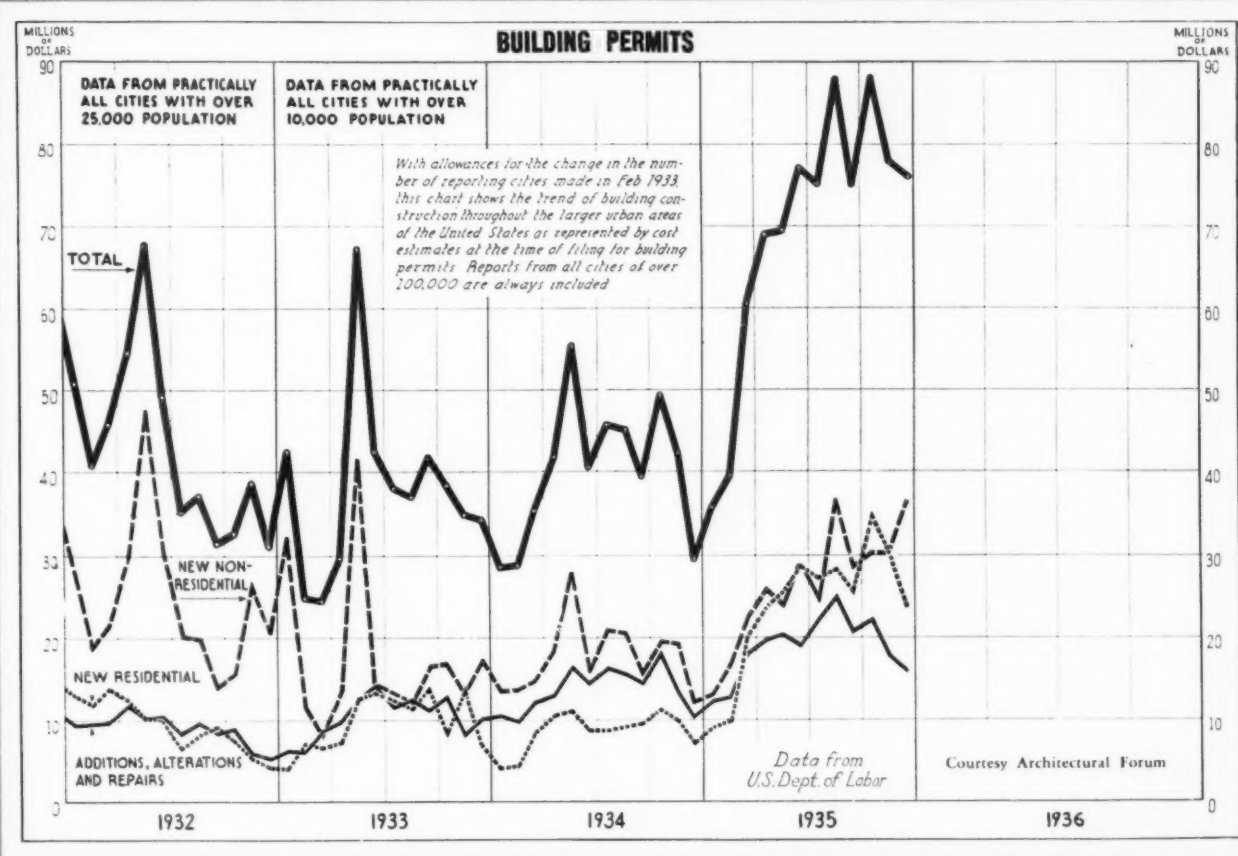
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ELECTRICAL CONTRACTING

ENGINEERING • INSTALLATION • REPAIRING • MARKETING



**THE UPWARD TREND OF CONSTRUCTION
BRINGS NEW OPPORTUNITIES
FOR ELECTRICAL CONTRACTORS**

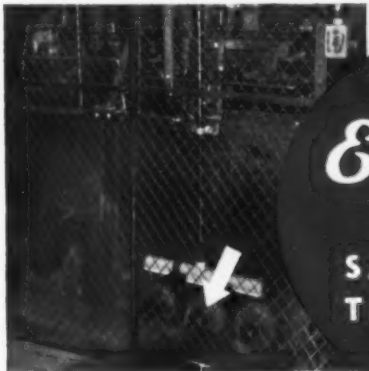
Right—The Lily Tulip Cup Corporation uses five "Dips" to melt paraffin in this cup-waxing machine. Electric heat was chosen because it can be accurately controlled and because it minimizes the fire hazard

Below—Three "Dips" and a thermostat keep this oil-quench tank in the Geometric Stamping Company's plant, Cleveland, at 110 F—the most satisfactory temperature for proper oil circulation

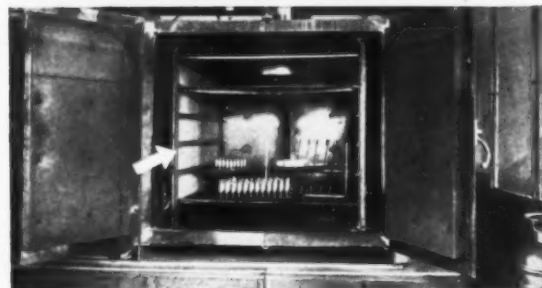


DO IT WITH
Electric Heat
THE CLEANEST,
SAFEST, AND USUALLY
THE LEAST-EXPENSIVE
WAY

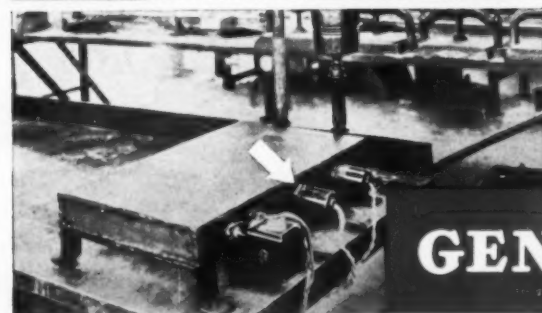
"Spot" economically heats this machine for trade-marking tennis balls, for the Dunlop Tire and Rubber Company, Buffalo



"Strip" heats this cabinet-type kiln for drying tennis rackets after shaping, in the Dunlop Tire & Rubber Company's plant, Buffalo



"Strip" heats this oven, used in an aging process for relieving strains in instrument coils, in the Leeds & Northrup Company's plant, Philadelphia



The Cortne Optical Co., New York, needed a hot plate whose entire surface could be maintained at the same temperature. Two "Dips," a thermostat, and a tank filled with oil solved the problem

YOUR local G-E Distributor is always ready to supply you with "Spot," "Strip," and "Dip"—the inexpensive Midget heating units that find so many applications in industry.

These Midgets are easily installed and will perform your heating jobs in the cleanest, safest, and usually the least-expensive way.

Pictured here are just a few typical jobs that they are doing—and doing to the entire satisfaction of their users. They can be obtained quickly from the nearest G-E Distributor. General Electric, Schenectady, New York.

160-33

GENERAL  ELECTRIC

S. B. WILLIAMS
Editor

F. J. SEILER
Assistant Editor

HOWARD EHRLICH
President

GLENN SUTTON
Manager

Established 1901

Official Publication
of the
National Electrical
Contractors Association

INSTALLATION

ENGINEERING

MAINTENANCE

REPAIRING

MANAGEMENT

MARKETING

for

ELECTRICAL CONTRACTORS

INDUSTRIAL
COMMERCIAL
RESIDENTIAL

ELECTRICAL INSPECTORS

ENGINEERS

SERVICE SHOPS

and others engaged
in the business of
electrical construction

ELECTRICAL CONTRACTING

With which is consolidated

The Electragist and Electrical Record

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Vol. 35 MARCH - 1936 No. 5

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FIRST *we brought you*
the original **"SLICK FINISH"**



wire with our
EBONY LINE

This saved you 50% in pulling time. The Ebony Line has been popular with contractors everywhere because it *saved*

"Pulling Time"....

THEN *we brought you*
the first **"IDENTIFIED CIRCUIT"**



wire with our
RAINBOW LINE

enabling you to do circuit testing in one third the time. The popularity of the Rainbow Line with contractors rests in the fact that it *saved*

"Belling Out Time".

NOW
we bring you

"CLEAN-STRIP" SAFECOTE

Here is the fastest stripping—cleanest stripping wire you have ever used.

Saves "Joining Time"

A comparative time study made during the wiring of a school building demonstrated that "U.S." Clean-strip Safecote is:

4½ times faster stripping per END than regular Code Wire.



2½ times faster stripping per FIXTURE than regular Code Wire.

Twice as fast as regular Code Wire in completing connections per FIXTURE.

Order a coil of "U.S." Clean-strip Safecote today.

Prove to yourself what it will save you in time and labor on pulling in, stripping, and joining.

United States Rubber Products, Inc.

1790 Broadway, New York, N. Y.



United States

Rubber Company



MARCH

1936

Influence

HOW far does the influence of a magazine like ELECTRICAL CONTRACTING extend? Does it go beyond its own readers?

EVERYONE is familiar with the article in *Readers Digest* which so startled the public that a wave of safe driving promotion has swept the country. While that, of course, is the unusual example of the external influence of a magazine, we are experiencing constantly the effects of articles in ELECTRICAL CONTRACTING. The most numerous are those of readers who in their own work try to duplicate something they have read in the magazine. Thus a shop in Minneapolis designed a new motor test board and a few weeks after the article appeared, a shop in North Carolina was building a similar board.

SUCH things, however, are expected of a business magazine. It is the influence that extends beyond the subscriber that is seldom appreciated. Take the last issue of ELECTRICAL CONTRACTING, for instance. A contractor asks for two copies of the article on filling station lighting to be rushed to a certain architect. A job is hanging in the balance and new business will probably result. An engineer from the Vacuum Oil Company requested extra copies of the same article so he could spread the information throughout his company. Other requests for extra copies of this article and reprints will influence the activities of hundreds of non-subscribers.

A CONTRACTOR in New York asked for twelve extra copies of the article on "Reducing Bootleg Wiring" so that he might spread the information among his competitors. A manufacturer sent out seven thousand reprints of an article showing some of his equipment as an example of modern practice.

A THOUSAND reprints of an improved shop practice article are ordered by the contractor whose operations were described. Prospective customers will get these reprints and some will take on this contractor's service thereby affecting the business of a great many manufacturers.

THE article on house wiring aroused the interest of leagues and utilities. Representatives from three cities have written ELECTRICAL CONTRACTING that they are ready to go ahead and want help.

A CIRCULATION statement of a strong magazine is, therefore, no indication of the complete influence of a magazine. Far beyond the subscribers every issue of ELECTRICAL CONTRACTING is having some effect upon plans, business, policies and developments.

\$250,000,000
for new school construction
in 1936 as result of
Federal aid

Special knowledge of up-to-date school
practice can make your share larger

CALL ON GRAYBAR'S WIDE EXPERIENCE TO HELP YOU TURN SCHOOL NEEDS INTO DOLLARS

... Federal aid is making possible \$250,000,000 worth of new school construction in 1936. The size of *your share* will be influenced by your knowledge of special school needs... of up-to-date school electrical equipment. **Graybar** stands ready to help you, both with willing advice based on long experience, and with a wide variety of products for each and every school need. Included in these products are Lighting Equipment and Lamps, Wire and Wiring Supplies, Program Sound Systems, Program Clocks, Fire Alarm, Laboratory Panels, Inter-Phones, Switchboards, Rectifiers, Ventilation Equipment, and Motors and Control. **Graybar**, Investigate! Write for our broadside "Making it Easier for the Contractor to Figure All School Electrical Specs." Send for it—today!



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OFFICES IN 78 PRINCIPAL CITIES. EXECUTIVE OFFICES: GRAYBAR BLDG., NEW YORK



WIRING SUPPLIES



LIGHTING



PROGRAM SOUND SYSTEMS



INTER-PHONES



VENTILATION



MOTORS and CONTROL

ELECTRICAL CONTRACTING

Vol. 35

MARCH, 1936

No. 5

▲
S. B. Williams, Editor
▼

FIELD BRIEFS

● ONE OF THE SIGNS of better business is the reawakened desire on the part of electrical contractors for local association activities. In the past few months a number of associations that had allowed their efforts to lapse during the depression, have taken a new lease on life. In addition, a number of new local associations have been formed.

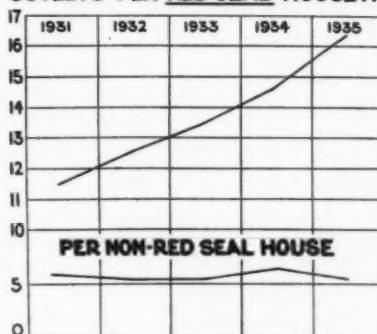
● TO AVOID the restriction of energy consuming electrical devices on farms, the REA of North Carolina recently decided to develop minimum farm wiring standards. Too many farms, it was found, would be so lacking in capacity as to prevent the reasonable use of devices within a short time without rewiring.

● ONE OF THE LASTING benefits that was derived from NRA, according to David Arthur of the Goldman Electric Co., New Rochelle, N. Y., is the continued interest which independent contractors of Westchester county are

maintaining in their organization. Before NRA these men had no organization, but they were brought together in the early stages of Code work to seek equitable representation on the administrative board.

● ELECTRICAL EQUIPMENT in Red Seal homes in Toronto is valued at \$13,300,000 as compared with \$5,700,000 worth in a like number of non-Red Seal homes.

**AVERAGE NUMBER OF "CONVENIENCE
OUTLETS" PER RED SEAL HOUSE...**



● THE LOS ANGELES City Council approved at a recent meeting the employment by the division of electricity of a full time inspector for the enforcement of the sub-standard appliance ordinance. Another inspector is to devote half time in the relief of the full time appliance inspector and to assist him in making checks of appliance stocks.

● BECAUSE OF the pleasing light he obtained at home with an I.E.S. study lamp, a Charlotte, N. C., hosiery mill owner installed one-hundred-twenty 500-watt indirect lighting units in his plant. As a result of this modernization move the lighting load totals 82 k.w., while the motors total only 75 h.p.

● EARLY IN FEBRUARY the millionth approved I.E.S. portable lamp was produced and presented to M. E. Skinner, chairman of the National Better Light-Better Sight Bureau.

House Wiring Can Be Sold

by S. B. Williams

Editor, *Electrical Contracting*

THE facts on the house wiring market presented in last month's issue laid bare the market possibilities and indicated the need for a nation-wide selling program. In this article another set of facts is presented, facts that show that planned selling of house wiring produces results.

The data set forth below represents activities carried on during the depression years, when it was most difficult to sell wiring. If such results can be accomplished during such years without any unification of program, it augurs well for the possibilities for the sale of adequate wiring and rewiring under well planned, coordinated efforts and national direction during a period of greatly improved business conditions.

The following activities are not to be considered as all that were carried on. They are selected merely to show the different angles to selling in which there has been a reported record of accomplishment.

1. REWIRING: A Boston contracting company (*see opposite page*) in one month last fall sold \$10,000 worth of rewiring in a campaign offering free inspection. The appeal was safety. Mailing pieces to a list of prospects, as well as direct solicitation were used. Nearly 60 per cent of inspections resulted in jobs of an average value of \$105.

2. ADEQUATE WIRING: In North Carolina, under the auspices of the state chapter of the International Association of Electrical Inspectors, adequate wiring was presented to builders, architects and the public. In the first sixty days of this activity, more than one hundred jobs were wired in accordance with the Industry Standard for Adequate Wiring. This work

was done without any appropriation. The activity was not confined to houses, but extended to a great many different kinds of buildings.

Nagle & Heald, Waterloo, Ia., first prize winner in the Adequate Wiring Sales Contest conducted by ELECTRICAL CONTRACTING in 1933, makes a definite layout on each job and by means of this layout sells the prospect on the need for adequate wiring, with the result that 85 per cent of the homes so wired are far above the average in adequacy.

3. RED SEAL: Red Seal wiring came from Toronto, where a few months ago they celebrated the completion of the 20,000th Red Seal home. It has been responsible for the wiring of over sixty thousand dwelling units in North America to the Red Seal standard. The results have varied from approximately 90 per cent of all homes constructed as in Toronto, to a smaller percentage in this country. But the fact remains that while the program was in effect the ratio of Red Seal homes to the total number built was steadily increasing. Even when the depression set in leagues with Red Seal activities were able to sell most new homes on Red Seal. At least 75 per cent of the Red Seal homes in the United States at the time they were wired were probably more than 50 per cent in excess of the minimum Red Seal standard. Figures from Toronto show that Red Seal houses last year had approximately twice as much wiring as non-Red Seal houses.

4. REINSPECTION: During the very worst part of the depression one Portland, Ore., inspector, unaided, in nineteen months was able to develop without the use of police power, between \$50,000 and \$60,000 worth of rewiring through reinspection.



One of the morning

5. SPECULATIVE HOUSES: The Electrical League of Rochester has adequately wired a speculative house to show builders and owners the advantages of adequate wiring. William Berken of Long Island is selling increased wiring to speculative builders on a basis whereby he helps the builders to sell the homes with the electrical work as a talking point.

6. MODEL HOMES: While a few years ago this used to be a popular way of getting crowds into well-wired homes, its use fell off considerably due to the decrease in new house construction. The General Electric Company, however, has taken this activity to new high levels nationally through its promotion of the New American home. The Marietta (Ohio) Electric Association modernized the wiring of an old home, and using it as a model attracted the attention of more than 12,000 visitors during the period it was open. A. Reiter, second prize winner in the Adequate Wiring Sales Contest conducted by ELECTRICAL CONTRACTING in 1933, has made his own home a model electrical home. This is typical of the manner in which a great many house wiring specialists sell adequate wiring.



sales conferences of the employees

\$10,000 in Rewiring in 1 Month

by Ralph S. Earle,

*Treasurer, Clark & Mills Electric Company
Boston and Cambridge, Mass.*

THE results of a particular campaign for new business are obviously of general interest and value only to the extent that they be used as a guide for other concerns in the conduct of their own endeavors to get new business.

The methods used by the Clark & Mills Electric Company to obtain re-wiring jobs can be used with reasonable assurance of success by any electrical contractor whether large or small.

The plan, developed from the experience derived from two previous campaigns of a similar kind and therefore pre-tested, is based on an offer of *free inspection* of the electric wiring with a written report of conditions found and an estimate of the cost of making such changes, if any, as are recommended.

The campaign ran from November

1 to November 30, 1935, with the first two weeks in December allowed for closing up unfinished work. The statistical results were as follows:

1. Estimates given	\$31,254.00
2. Work accepted	9,696.98
3. No. of names covered by mailing lists	14,210
4. No. of cards asking for free inspection received through the mails	114
5. No. of requests from personal solicitation ..	70
Total requests for free inspections	184
6. No. of inspections made resulting in jobs	92
7. Average amount for job	\$105.40
8. No. of inspections not made at close of campaign	19
9. Total expense including commissions and remodeling of company's own auditorium	\$1,252.59

An analysis of the above figures shows that 8/10 of one per cent replied to the letters; or eight reply cards were received from each 1,000 names on the mailing lists. Fifty-five and seven-tenths per cent (55.7%) of all requests for free inspection resulted in jobs averaging \$105.40 each. It will be noted that 31 per cent of the amount of work recommended to be done was actually ordered during the period of the campaign.

The value of personal solicitation is seen in the fact that of the \$9,696.98 of business obtained, \$6,305.33 or 65.1 per cent came from personal solicitation by members of the company. It is also interesting to note, as bearing on the importance of cooperative campaigns, that not only was the major portion of the work received by individual effort but a larger percentage of the work estimated from this source was accepted, e.g., 42.3 per cent of the estimates were accepted while only 20.7 per cent was accepted through requests coming through the mails.

These figures would seem to indicate that the direct mail is important but does not have the value or take the place of the personal work which a cooperative campaign accomplishes. In this particular campaign only 34.9 per cent of the business came from the direct mailings.

From the above figures it is possible to get some idea of what to expect from such a campaign and thus enable any contractor contemplating a similar campaign to fix his own quota.

But the figures given above are for actual work ordered during the short period of the campaign and, while they more than doubled the amount of work received in any one month during the previous campaign, they do not by any means represent a correct picture of the value of the campaign. In fact the potential value in future business will continue for months to come and far exceed the actual business received during the campaign itself.

Six new journeymen were on the payrolls when the campaign ended and nineteen inspections still remained to be made, it being impossible to make them all within the time allowed.

In addition to the increased employment many new customers have been added to our books as the direct result of this campaign and some of these new customers have

already become customers of our appliance department.

The campaign was in every sense a cooperative one. Twenty out of forty-one employees of the company received commissions; this includes the office force and journeymen as well as the salesmen. Every employee was assigned some specific work to do and real ability was discovered. To mention just a few cases, one young man prepared a remarkably well thought out and practical plan carefully drawn with accompanying specifications, for rearranging our auditorium and the entire store. Another person disclosed real ability for the preparation of the promotional material and plans for the campaign. Still another member of the office force prepared and read an extremely able

exposition of the work of the clerical force and its relationship and value to a sales campaign in the handling of mailing lists, estimates, letters and statistical data. Another proved to be just the right one to serve as hostess. Many other examples could be given of unsuspected talent brought out through this cooperative idea, all to be developed and encouraged thereby raising the general standard and efficiency of the company for years to come.

From outside sources came an immediate response to our call for help and a willingness to cooperate with the company in making the campaign a success. For the purpose of maintaining interest and enthusiasm throughout the campaign men were carefully selected to speak at the weekly morning conferences. To open

the campaign, S. B. Williams, editor of "Electrical Contracting," came on from New York especially for this purpose, taking for his subject "The Need for Rewiring." (This address was subsequently published in "Electrical Contracting," December, 1935.)

Among other speakers were W. L. Dodd, sales promotion, General Electric Company; Bertrand R. Canfield, instructor in sales management and advertising at Babson Institute; Julius Daniels, Edison Electric Illuminating Company of Boston; and Harding U. Greene, manager of the Cambridge Electric Light Company.

Conditions today are far more favorable for this kind of a campaign than ever before. The public is beginning to realize the need of rewiring, the local wiring inspectors and light companies will cooperate.

Inspector Display

Reduces Wiring Errors

FOURTEEN SUGGESTIONS TO AVOID MISTAKES IN BUILDING METER SERVICE BOARDS

- | | |
|---|---|
| 1. No. 6 1-wire armored cable to be used for water ground. (Instead of rubber-covered wire run open.) | 7. Splices must be soldered properly. |
| 2. Service gap should be run to top of service switch. (Instead of to lower part of switch.) | 8. Separate end lines to be run for each meter cabinet. (Instead of being combined in one raceway and in one end line box.) |
| 3. Only one bus to be run from service switch. | 9. Lugs not to be taped. |
| 4. Lugs must be cleaned of excess solder and dirt. | 10. End line boxes not installed properly. (Must be hinged at side or top.) |
| 5. Only one lug may be connected to each meter block stud. | 11. Unused knockouts must be closed. |
| 6. Meter neutral-potential should be not larger than No. 10 wire. | 12. Neutral must be made solid. (Fused neutrals not permitted.) |
| | 13. Not smaller than No. 8 wire to be used for meter cutout taps. |
| | 14. Wire must be soldered in lug. |

A neon sign company furnished a display of the "right" and "wrong" methods, which includes the following ten sources of common violations.

TEN COMMON VIOLATIONS IN NEON SIGN WORK

- | | |
|--|--|
| 1. Connections terminated improperly. | 7. Splices not soldered. |
| 2. Maker's name not on sign. | 8. Approved connector should be used with glass sleeves and rubber bushings. |
| 3. Exposed electrodes. | 9. Lamp cord used in place of armored cable. |
| 4. Unapproved high tension wire. | 10. High tension cable exposed to mechanical injury. (Use flexible or rigid steel conduit with housing boxes.) |
| 5. Open type transformer not approved. | |
| 6. Transformer not grounded. | |

WITH 3,500 or more licensed master electricians doing work in Brooklyn, N. Y., the electrical inspection department must handle each day a large number of typical wiring violations on new installations. To minimize the recurrence of such errors, and to clarify its installation requirements, a practical set of office displays has been put to effective use. Because the most frequent sources of error are found to be (1) at service and metering equipment, (2) in connection with neon signs, and (3) at oil burner controls, displays of such work are provided which can be examined and discussed right in the Brooklyn office of the Department of Water Supply, Gas and Electricity. Hundreds of contractors thrash out their troubles during the year with district inspectors or their superiors, by coming to the main office where they may ask for an explanation of any disputed question. With actual installation examples thus made available, this procedure is said to have greatly simplified inspection routine.

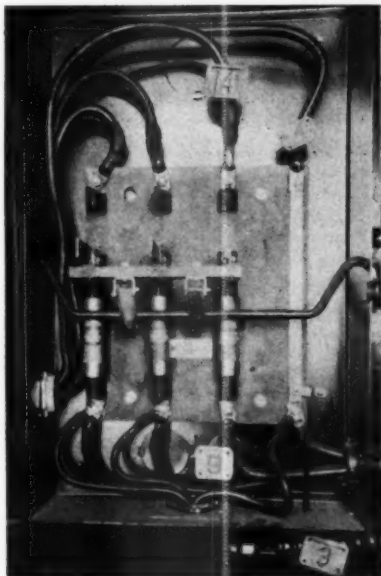
In addition to the three major displays already mentioned, there are

also several display boards upon which are mounted approved wires, cables, wiring devices, conduit fittings and neon sign fittings. A bulletin rack containing special manufacturer literature covering time switches, control apparatus, wiring systems, and other products used by contractors is located near the permit counter where all visitors may help themselves.

The right and wrong way to install service and metering equipment is shown with equipment that was furnished by the power company, and which is assembled first to show fourteen common errors, and at the bottom to show their standard installation practice. Particular emphasis is placed on metering layouts which will later permit additional metering facilities without cluttered equipment.

These display methods provide practical examples which more or less speak for themselves, without resorting to code paragraphs.

(At right) The right and wrong ways of meter board assembly are displayed in cooperation with the power company. Fourteen common mistakes are listed upon a poster mounted at the upper left end of the exhibit. Large metal number tags are attached to the "wrong way" equipment comprising the upper row, at the places where this installation is wrongly made. These numbers refer to similarly numbered items on the poster.



A closeup view of errors in connecting the main service switch. Four common violations are pointed out by attaching tags numbered 3, 4, 9 and 14.



The permit counter is a busy gathering point for Brooklyn contractors. Products are kept on display here, while the bulletin rack contains free trade literature for those who wish to help themselves. To the left of the bulletin rack is an exhibit of typical oil-burner controls to show how wiring connections should be made.



Sign violations are exhibited by means of a 6-ft. by 6-ft. assembly which has the "wrong way" installation at the left. The ten most common violations are listed on a small chart in the upper left center panel.



1

Reducing WALL OUTLET Labor

THE installation of wall outlet boxes in a new 25-story hospital unit of the Jersey City, N. J., Medical Center, was planned to cut down every possible element of "grief" labor. Advance assembly of typical box combinations; the use of all-thread conduit stock instead of assorted nipples; speedy box anchoring at metal door frames; and the advance make-up of wall stubs ahead of the metal lathers, were important factors in bringing this about. Joseph Newman, Inc., local electrical contractor, was thus able to simplify

the make-up, setting and supporting of a wide variety of outlet boxes that were used in this job.

Most of the floors had suspended metal lath and plaster ceilings, and all were provided with tile partitions. The confusion that usually occurs during the installation of the metal lath because of the lathers' scaffolding, prompted making up in advance all the conduits which were to drop into partitions from suspended ceiling outlets. These runs were in single 10-ft. lengths, bent to correct box height and tied to the



2

1. Full lengths of bent conduit, equipped with their outlet box were placed in readiness for the tile partition ahead of the masons and metal lathers. After the lathers' scaffolds were up, the only conduit work that had to be done on the ceiling level consisted of horizontal runs between ceiling outlets, and short pieces connecting the partition runs to the ceiling outlets.

2. Where typical outlet spacings occurred, machine-threaded conduit lengths were prepared and assembled in stock lots for the box-setting crew. More than 400 locations required a wall fan, 3-gang switch, and night light box assembly as in the foreground.

3. This switch outlet box is held in a permanent position by a $\frac{1}{2}$ -in. threaded steel supporting rod. A flat iron saddle or bridge that is tapped for the rod is compressed against the inner flanges of the metal door frame, as the inner end of the rod presses the web of the door frame. A smaller flat iron bridge which is riveted so as to spin freely on the inner end of the rod, provides a pressure shoe or pad against the door frame. No bolt holes need be drilled in the metal door.

4. Outlets that must be located in tile walls which run at right angles to the door frame, require an angle supporting rod. These were not readily available, therefore, an extension was made out of a ceiling box bar. This was bent at a right angle and securely wired to the $\frac{1}{2}$ -in. rod.

5. Here two outlets of different conduit systems were easily spaced beside a metal door frame—one of the "mean" conditions to keep under control until the boxes are bricked in.

6. The ease with which patients' signal dome outlet boxes could be made secure above the metal door frames allowed the use of horizontal runs in the corridor partitions from door to door. This eliminated the looping of conduits from the ceiling, thus greatly reducing both wire and conduit footages and conduit nipping labor.

7. Where groups of outlets occurred in back-to-back positions, running thread conduit was cut in lengths to space these boxes according to partition thicknesses. Spacer locknuts were used between the boxes to obtain correct separation.

8. Sometimes back-to-back boxes were not possible, because of the outlet height not being alike in both rooms. The top outlet is too close to its neighbor on the opposite side of the wall to accommodate an off-set nipple. A running thread nipple was therefore cut to space the lower box correctly, after which an extension collar was attached to bring it out to the opposite wall line.

9. A full length of conduit lacked about 3 in. of fitting this floor-stubbed outlet box. A piece of running thread nipple finished the job quickly.

10. When an outlet required nipples more than 5½ in. long, they were threaded to fit, otherwise the shorter lengths were cut from all-threaded stock.

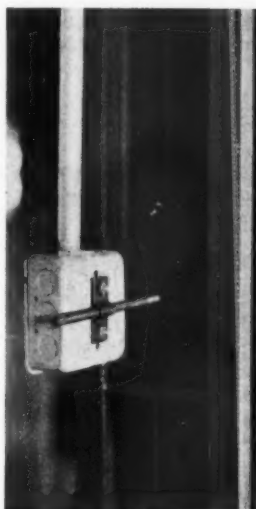
main channel hangers. They were left hanging in this position until they were ready to be completed at various ceiling outlets. This work could be done under more favorable conditions while the floors were not blocked by scaffolds, and while the ceilings were not yet filled with lath-supporting channels. The actual conduit work that needed to be done in conjunction with the lathers then consisted only of installing horizontal runs between ceiling outlets, and installing short lengths from these outlets to the 10-ft. lengths that were previously run for the wall outlets.

Thus there was no nipping at the wall outlets.

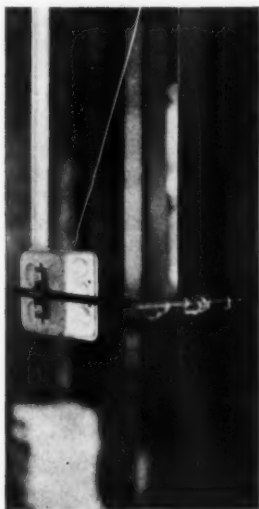
About 400 typical locations required a fan, 3-gang switch and night light directly above each other. These were assembled in stock lots from machine-threaded conduit. The threading machine was also used during the stock-keeper's spare time for making lengths of $\frac{1}{2}$ -in., $\frac{3}{4}$ -in., and 1-in. running thread stock. Short nipples ranging from close, up to 6-in. were thus available for spacing or nipping outlets by merely cutting off the desired length. No time was spent in selecting a definite

length of threaded-end nipple from a stock bin, or in carrying such stock around on the job. The box-setting crews kept a supply of running thread conduit on hand and quickly made up the outlet complete as they went along.

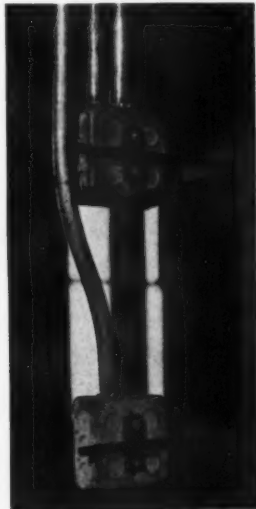
Uniform and rigid positioning of switch outlets that occurred beside and above metal door frames, was accomplished by using a threaded supporting stud to which the outlet box was bolted. Once the box was made fast in its proper position, no further attention was necessary during the tile setting operation.



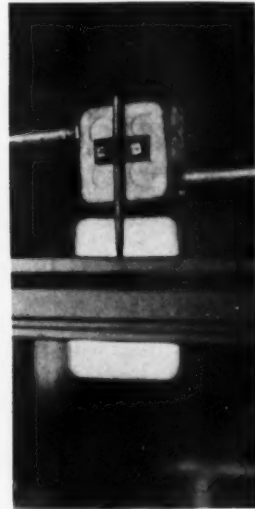
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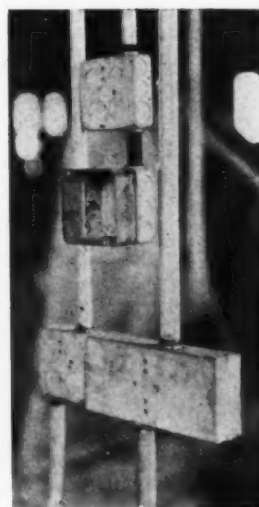
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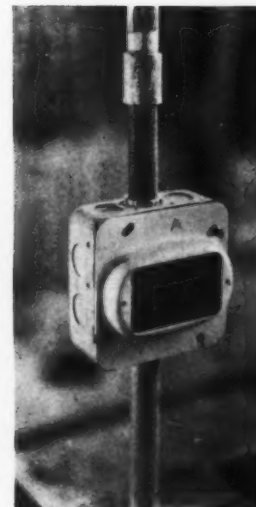
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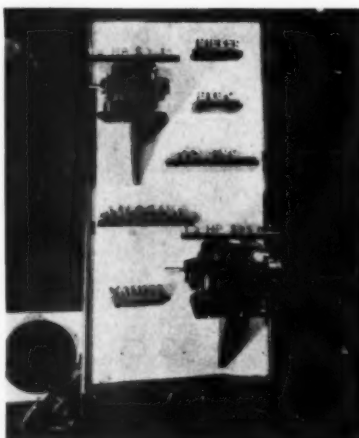
Shop Display Helps Industrial Contractor to Increase Volume



The modern version of an industrial service organization's headquarters. Floodlights are provided on the roof for the pedestal-mounted 50 hp. motor, while a window display of various industrial equipment is kept lighted of evenings.

A THREE-YEAR-OLD experiment which injected modern display methods into industrial contracting selling, as conducted by the Eifler Electric Company, Inc., of Union City, N. J., has steadily increased its business to a point where eighteen men were kept busy during 1935. This company goes in for industrial construction, apparatus repair and sales service from every angle. Customers range from large plants to oil companies, oil burner agencies and others who operate or service motorized equipment.

To make people realize that the Eifler organization was able to render a complete service, the plant was designed to symbolize or look the part. Merchandising display

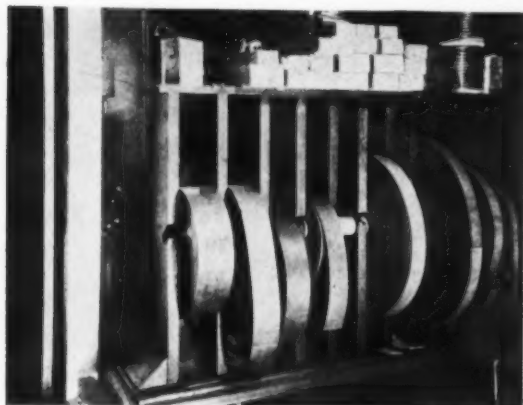


Special treatment has been given small motor displays employing changeable letters to permit displays in keeping with seasonal variations.

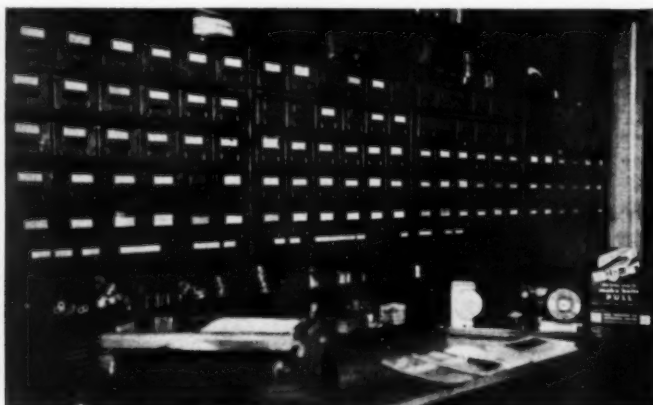
ideas were adopted to give visiting customers or passers-by a favorable impression. Its modern motor service shop was arranged toward the rear to permit making full use of street frontage for sales-building equipment displays.

Motors of all popular sizes, oil and air-cooled transformers, blowers, pumps, drives, belting, pulleys, floodlights, controllers and other items are neatly arranged along clean aisles that lead through the display space to the service counter. Customers who have occasion to "drop in" for some necessary item obtain a favorable impression as they pass the display areas on their way to the service counter.

Because of having chosen a prominent location at a well-traveled



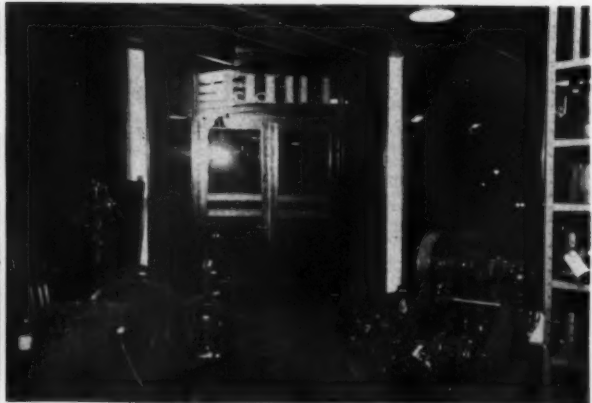
Belting service for small and large customers is an important part of this firm's business. This handy display rack is located in a corner window, and brings many small plant operators around for "fixed while you wait" belting service.



The service counter with its neatly arranged metal shelving at the back. A wide assortment of brushes, bearings and other parts items are accessible for filling orders quickly. The small belt tension demonstrator is kept here, where customers may try it out.



Valuable street frontage (window to the right) is used to display a wide selection of industrial equipment. Customers can look around among these products, because they are kept clean and orderly. A traveling electric hoist permits the quick removal of any heavy item from a compact floor display.



Looking out toward the modernistic entrance. The passage leads back toward the service counter past pumps, blowers, transformers, fractional motors, pulleys and various types of drives. This display gives the customer an impression of complete and ready service.

street intersection, the pleasing appearance of the Eifler shop has made it known for considerable distances in this populous community of continuous cities across the Hudson from Manhattan. After having seen the place at one time or another, the customer's first visit confirms a good impression.

When trouble develops, spare motors of the correct size can usually be had for replacement during important repairs. If belts give trouble, a quick repair job can be

made, and incidentally, belt troubles offer opportunities for selling modern short-center drives. If the cost of moving the motor is objected to, then a popular automatic tension adjusting base or drive is sold. These can be seen in the office, where a miniature demonstrator model, using a small belted motor is kept on the service counter to show how the drive functions, and how easily it will take up belt stretch.

But motor bases, though an important part of this company's busi-

ness, are only one major item. If a basement becomes flooded, there are sump pumps to select from; the factory yard may need another floodlight, or some machines may be inefficiently operated because they lack modern automatic controllers. The choice is there, where a customer may look, compare and reason for himself—without getting his hands dirty. And few customers walk out because of those sad, empty words, "We don't have it, sir, but we can order it for you."

LAYOUTS SIMPLIFIED

STANDARDIZED job layout procedure is followed by the New York Edison Company, Inc., which has simplified the mass supervision of changeover work. These jobs are all done by electrical contractors at bid prices and at company expense, involving up to 150 projects per week, and ranging in size from \$15.00 up to large changeovers costing \$100,000 or more.

Because there is such a similarity between the power company's obligation in planning and supervising such work and that of the electrical contractor who does alteration work directly for his customers, the layout methods of this company's distribution engineering department are presented. From the contractor viewpoint this method provides: (1)

An understandable plan for presentation to the customer, (2) the elimination of misunderstandings as to how much work will be done, (3) a layout that clarifies the preparation of estimates, (4) a means of obtaining approval from the power company and the inspection authorities before commencing work, thus avoiding the possibility of having to make expensive changes after the job is finished, (5) more exacting fabrication of special raceways, junction boxes and supporting framework to reduce on-the-job assembly costs, and (6) a definite description of such jobs for the foreman to follow without misunderstandings.

Except for large changeover jobs, the layouts are usually condensed to

require only one sheet of sketch paper, or blue print. Jobs amounting to less than \$150 are usually field engineer sketches, while those running up to \$2,000 or \$3,000 employ drawings that are made up by draughtsmen from rough field sketches. In either case these layouts aim to show the related positions of each item of equipment that is to be altered or replaced. A schedule of notes is incorporated with the layout, which describes each operation without referring to supplementary pages of specifications. Each note is numbered in the schedule and at its position on the layout. With this system there is no chance of additional descriptive pages becoming misplaced. The sheet that covers the layout likewise



LAYOUTS for proposed changes include on one drawing the existing arrangement of equipment (upper); the re-vamped positions, connections, and added equipment (lower); and a numbered schedule of specification notes, each key number appearing on the existing or proposed drawings. When larger jobs require riser diagrams or floor plans, these are also included.

An isometric or exploded view sketch that is used for small jobs.

contains a briefly worded schedule of work to be done.

Because of the power company's departmental routine, the sketches of smaller jobs are made up with special pencils which permit fifteen or more copies to be duplicated from a master sketch for submission to the customer, contractor bidders, field supervisors, and the various company departments. The larger jobs that are laid out by draughtsmen are blue-printed for the required number of copies.

The principles which govern the preparation of field sketches and

drawings are to eliminate unnecessary expense in preparing layouts and specifications. The smaller jobs are therefore sketched by the field engineer without requiring any assistance from the draughting room. This system could easily be followed by the contractor. By noting the operations on the sketch as done by this company, a considerable amount of supplementary letter writing could be avoided. The need for additional copies of sketches would determine whether to use pencil carbon, or whether to have blue prints made. This company's special pencil

sketches require a duplicating machine which would be too expensive for the average contractor.

In addition to the foregoing description of proposed alteration work, the power company provides each of its bidders with a general specification. This applies to all future jobs upon which they may be invited to bid. It covers the general company requirements as to procedure in making changeovers such as defining the various parties involved, the removal and replacement of wiring and equipment, permits, insurance, bond and other subjects.

SMALL JOB **COST RECORDS** **SIMPLIFIED**

A JOB record card that is used by the Ace Electric Company of Portland, Ore., combines: (1) A detailed schedule of outlets to be installed, (2) a record of each divisional quotation applying to the job, (3) a detailed record of workmen's time, (4) a record of all the items of materials sent out, returned and used, and (5) the total cost of the completed job for comparison with the price that was quoted. By keeping this type of record properly filed in the office, it affords a quick reference for making cost or quantity comparisons with other jobs, for looking up complaints, for checking back on specific types of materials that were used, and for identifying the men who installed old jobs.

The outlet and quotation schedule is copied to this job form from a somewhat similar quotation form as soon as an order has been secured. The blank spaces at the lower left corner are used for special notations that could not be entered in the standard columns or headings. When the job is started, the items of outgoing material are posted in the "Out" column on the reverse side of the card, while the daily labor is posted on the front side from the workmen time cards. The final returned material items are posted to the "In" column. The difference between charges and credits constitute the "Used" items. These are extended at cost and totaled to comprise a part of the final grand total cost entry that appears at the bottom left-hand corner of the reverse side of the form. This record is given a job number which has been assigned to it from the ledger. This number is written in the upper margin.

On jobs which require several deliveries of similar material the items must be posted at each delivery. The foreman on each job is provided with a "Material Used" form which is like the back side of the office record, and which is printed on thinner paper. It must be made out at the end of each day, and must list the items of material that were installed. This daily job record is said to provide a useful check-back against the office record of materials charged out and returned from the job.

There are 112 spaces on this form for entering various items of material. Some of these are printed in, while others are left partially blank for inserting sizes or catalog numbers. The arrangement and listing of items is changed from year to year to incorporate the types of material that are most frequently used as the local methods of wiring change. The card is 7½ in. wide and 12½ in. long.

JOB CARD
ACE ELECTRIC COMPANY

NAME _____
JOB ADDRESS _____
BILLING ADDRESS _____

Wiring _____
Flood _____
Fixtures _____
Range _____
Water Heater _____
Oil Burner _____
Fan _____

Wired by _____

ITEM	QTY	UNIT	PRICE	TOTAL	REMARKS
No. 1000					
No. 1001					
No. 1002					
No. 1003					
No. 1004					
No. 1005					
No. 1006					
No. 1007					
No. 1008					
No. 1009					
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No. 1099					
No. 1100					
No. 1101					
No. 1102					
No. 1103					
No. 1104					
No. 1105					
No. 1106					
No. 1107					
No. 1108					
No. 1109					
No. 1110					
No. 1111					
No. 1112					

TOTAL COST OF JOB _____
Labor _____
Material _____
Grand Total _____

13

Practical Field Tests for SMALL MOTORS

SERVICE men encounter many puzzling motor problems while making "trouble" calls in stores, apartments, and institutions. The Electric Refrigerator Motor Company, Inc., Philadelphia, Pa., after having specialized in servicing and reconditioning fractional-horsepower motors for a number of years, found that certain general motor troubles could be diagnosed by field service men, without the use of special equipment. The following hints were compiled by this company and comprise a diagnosis of trouble on motors of the repulsion-induction type.

1. If the name plate is burnt or red in color, it is a good indication that the motor is burnt up.

2. Check bearings for up and down play, also side play. If you cannot feel any play in bearings this way, then pull out wick, take a flash light and light up oil well and move the shaft again. If there is any wear on bearings you will see the oil squeezing out the side of the shaft.

3. Check brush-holder for wobbling when motor is starting on repulsion. There are several things that may also cause a brush-holder to wobble (a) worn brush-holder, (b) one or two brushes shorter than the rest, (c) governor weights push rods worn, or a commutator face may not be true.

4. Sparking at brushes may be caused by the brush-holder that is off neutral. Try shifting brush-holder to top dead center where armature locks and will not rotate in either direction, then move brush-holder (with current off) one and a half bars towards direction of rotation. Check brushes to see if they

are parallel with commutator bars and not riding on two bars at the same time. Check brushes to see if they are free in brush-holder. Check brush spring tension. Brushes may be worn down, which will cause sparking.

5. Check for thrown solder. Check windings to see if they are burnt, charred, etc. by inserting fingers through inspection plate hole.

6. Shorted armature. Turn off switch, lift brush-holder and brushes off commutator, turn on switch. Remain holding brush-holder and brushes off commutator with left hand, revolve armature by pulley with right hand. If armature will not turn, and has a tendency to lock, it is shorted. Do not confuse a dragging armature on the pole pieces where bearings are worn out with a shorted armature. If armature is not shorted it will revolve freely.

7. Shorted stator. (a) Lights will dim. (b) Correct size fuse will blow. Start motor with com-

pressor load on if armature comes up to speed and throws out brushes, off commutator, then the speed decreases again, causing the brushes to go back on commutator. This is a good indication of a shorted stator, but can not be relied upon entirely because the governor spring may be weak, or the short circuiting device may not be making good contact. If you run into a condition like this, try removing the short-circuiting device and governor spring and push rods. Then: (a) Check push rods for wear, this will cause the trouble sometimes. (b) Clean short-circuiting device or replace with new bracket. (c) Replace governor spring or stretch the old one a bit.

8. Excessive, uneven rumbling in motor. If bearings are o.k., disconnect motor from base, remove belt, then start motor. If it vibrates and shimmies off base, then the cause is (a) armature out of balance or field coils with some turns left out of one or two coils, or (b) too many windings in some of the coils.

9. If motor does not come up to speed on start, time the motor or count the number of seconds it takes for the motor on repulsion, then mark the brush-holder setting. Move the brush-holder against rotation about $\frac{1}{4}$ in. Check motor again to see if you have caused it to gain speed. If not, move brush-holder $\frac{1}{4}$ in. from original brush-holder setting in direction of rotation and check again. If no gain in speed is accomplished, check temperature of motor for heating up. If it is found to be heating and you are sure the compressor is o.k., there is a possibility that either the armature or stator is shorted, or that the bearings are worn.

10. Always test each lead for a circuit, individually.

11. Grounded stator. Unless a ground is bad here, it will not show up on 110 volts.

12. Grounded armature. To test remove from stator, take off brush-holder and pull out short circuiting device.

13. If excessive brush wear is experienced, check the armature for an open circuit.

IMPROVED PRODUCT

provides electrical contractors with a sales approach to industrial modernization

IMPROVEMENT of the product is of major interest to every industrial executive. Electrical contractors can make important suggestions and so render real services in this respect. The accompanying chart translates contractors' services and equipment into the customer's self interest in the matter of product improvement. The subsidiary table summarizes equipment sales possibilities.

There have been many interesting plant practices involving some of the points in the chart. Under welding, for example, a company in Trenton, N. J., which manufactures large ice boxes and refrigerated display cases for grocers and butchers, found that by applying spot welding to the manufacture of wire-rack shelves it could speed up production on these parts ten times at the same

Electrical Equipment which can be sold to IMPROVE THE PRODUCT

Electroplating equipment
together with auxiliary control

Fans and blowers

Heating units
ovens, space heaters, immersion-type heaters

Instruments for use in inspection and test

Lighting equipment

Meters
indicating and recording

Switches
time, limit, interlocking

Thermostatic control

Welding equipment and supplies

SALES ANALYSIS CHART to sell "Improving the Product"

Plant Objectives	Electrical contracting services or equipment which can be sold to help attain these plant objectives
Improving strength, 1. durability, or appearance of product	Electric welding in place of riveting or bolting in metal parts assembly
	Modern electroplating equipment, with emphasis on reliability of current supply and control
	Installation of booths, with proper suction ducts for removal of fumes, to make possible spraying of paints, varnishes, lacquers, and the like, in place of hand operations
Closer quality 2. control in basic processes	Electric ovens and furnaces for heat treating
	Immersion and other types of small electric heating units where batches must be brought to temperature quickly, and/or closely controlled
	Electric space heaters in combination with fans or blowers, often directly in assembly line, for quick drying
	Installation of metering circuits to permit the bringing together into one place of indicating and recording meters for centralized control of widely scattered operations
	Thermostatic control of room temperatures, or installation of automatically controlled space heaters or unit air conditioners where sensitive processes are carried on
Elimination of the human 3. equation wherever possible	Application of electric clock and time switches to cyclical processes and operations.
	Application of indicating ammeters to motors driving electric mixers for indicating consistency of mix by load on motor, to driving motors on metal-cutting machines to show depths of cuts; and to similar controls
	Color matchers, "electric tasters," and other phototube or vacuum-tube devices in inspection and test to substitute dial readings in place of operators' judgment. Phototube counting and sorting devices
4. Minimizing spoilage	Electric interlocking to insure proper sequence of certain operations
	Proper quality of illumination to insure color discrimination where necessary
	Reduction of employee fatigue by means of better illumination, ventilation, heating, and the like

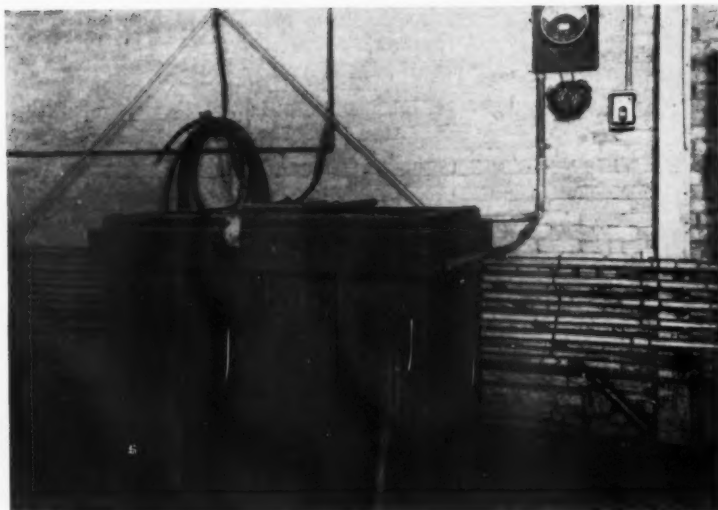
time greatly strengthening the product.

Meter circuits are often used to centralize control of widely scattered operations. In a large Rhode Island chemical works, five indicating ammeters on a central board show whether all acid pumps are carrying their loads properly. Three other electric indicating instruments on this board, connected with thermocouples, give temperatures of molten sulphur and sulphuric acid at various points in the plant. These temperatures are at the same time penned by a recording meter. With the help of this "centralized brain" one attendant can keep check of every step in a complicated industrial process.

An interesting use of indicating

meters to show consistency of mix was found in a New York City ice cream plant, where a meter connected with the feed to a motor on a large ice-cream mixer enables the operator to control his process accurately.

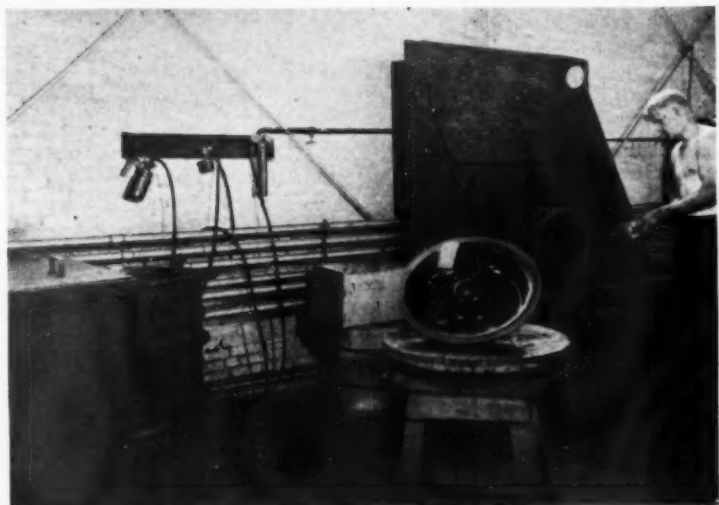
In a Brooklyn printing plant devoted to the manufacture of embossed and colored labels a long, slowly moving conveyor belt takes printed sheets directly from a varnishing machine and passes them under blasts of hot air from special heating coils. Electric interlocking is such that the operator cannot work the varnishing machine unless the heat is on and the blowers are in operation. Thus is produced an effective automatic check against spoilage.



Grease removal vat for cast or solid steel motor parts.

The cleanoff platform. Windings are sprayed here with lacquer and varnish also.

MOTOR PARTS CLEANING



THE complete removal of oil and dirt accumulations from motor end bells and bases represents a more important operation than the mere desire to return the customer's motor in spick and span condition. Since there are these reasons, the Electrical Installation Company of Cambridge, Mass., has equipped its shop with facilities which permit this work being done inexpensively, yet in a thorough manner.

A gas-heated solvent vat is employed which is wired similarly to the commercial plater's vat. Solid metal parts are submerged in a diluted commercial solvent for three to four hours at a temperature of 180 to 190 deg. F. A 6-volt current is passed through the solution and conducted through the submerged

metal parts to horizontal steel suspension hook bars which lie upon the outside rim of the vat. This metal rim is insulated from the vat walls and is connected to the opposite polarity, thus completing the circuit.

After a short soaking the current is switched on, causing bubbles to form on the metal surfaces. When these bubbles burst, they carry off the closely adhering grease, oil and dirt. The loosened material remains on the metal in some instances, such as at sharp corners or webs. This is easily washed off on the hosing rack with nozzle pressure.

After such thorough cleaning it is possible to detect cracks, casting flaws, or doubtful repairs that were made to motor parts. These conditions may be the cause of bearing

misalignment, which might discredit an otherwise good repair job. When these motor parts are removed and hosed off their own temperature dries them quickly in readiness for inspection and re-painting for shipment.

A metal spray and cleaning booth is provided beside the solvent vat. Here a motor part may be hosed off with water, or with air at 80 to 100 lbs. pressure. Gasoline may also be used by means of a syphon nozzle spray attachment. This latter method is useful for cleaning laminated units or small tool equipment that has not been soaked in solvent. Spraying is also done at this booth. Air is provided at 38 to 45 lbs. pressure for the correct atomization of varnishes and lacquers.

Engineering

Will Hold Industrial Business

QUOTING from one of his favorite gems of business philosophy, Karr Parker of Buffalo, N. Y., recently read this statement: "The future looks bright for those who will work and mind their own business." "That," said Mr. Parker, "is one of the things too many fellows are not doing these days. There is business for the alert electrical contractor, but too few are minding their own business, that is to say, the real problems of their customers. Instead, it is so much easier to find reasons for complaint about what some other fellow, or some other branch of the industry is doing, than to go out and look for the things which the contractor can do for his customer's betterment. This is no time to look for artificial props, or to attempt to build business by prohibition or by government regulation. The sound value of good services, good planning, and aggressive management will solve many of their problems automatically."

Mr. Parker is president of McCarthy Bros. & Ford, and the McCarthy-Ford Electric Company, firms that have been in business at Buffalo for thirty-seven years. During this time their business has included many large industrial operations. The experiences of these many successful years have resulted in the establishment of definite policies, regarding the selling of industrials, the type of engineering services to offer them, and to what extent it can expect to hold such a market. Having also operated an electrical wholesaling company for many years, Mr. Parker stands qualified to discuss this relationship also, insofar as it concerns the contractor's hope of doing business with industrialists. He is a member of the executive committee of the National Electrical Wholesalers Association and president of the Mohawk Valley Club.

This company is doing work at



*An interview with
Karr Parker
of Buffalo
by a staff member*

this time in several of the largest industrial plants of Buffalo. Much of this work comes from close co-operation with executives and engineers who want reliable and experienced assistance. Some factories are recognizing the poor economies which resulted during the depression from attempting to do their own construction work, such as accumulations of ill-chosen stocks, allowing salesmen to oversell them, and the employment of mediocre mechanics.

To sell industrial jobs, and to hold this class of customers, Mr. Parker is not inclined to worry about so-called "gyp" competition. First, the intelligent industrial executive appreciates a sound analysis of his construction problems, when it is done by competent engineers who are familiar with the subject. Assuming that there will always be more or less activity among hungry would-

be wholesalers to sell something to somebody, Mr. Parker maintains it to be the responsibility of our better industrial contractors to off-set these efforts with the greater benefits which accrue to the customer through good engineering.

Engineering must mean all that the word implies. Analyses must be made of complete plants, their drives, distribution, power factor, lighting efficiency, controls, etc. These findings must be reported in concrete form, supported by detailed drawings, and in many cases, with specifications.

"But what about protecting all this costly sales effort? How do you avoid having your prospect lay all this data in the laps of their own crew, or giving it out to your competitors?" we asked. Mr. Parker then proceeded to unroll a drawing which had been prepared in the McCarthy Bros. & Ford engineering department. In the lower right-hand corner of each sheet there was a white blocked-out space in which appeared the following imprint:

This Drawing in Design and Detail is the Property
of
McCarthy Bros. & Ford
and is loaned

Subject to return upon demand and upon the express condition that it must not be copied or used except by permission. Do not use for construction unless certified.

This procedure is said to sustain the company's rights of preference on important industrial operations. Not expecting anything to be dropped into his lap, nor having any designs upon artificial legislation that would tend to prohibit industrials from attempting to do their own work, Mr. Parker prefers to stand on the principles of good engineering, efficient and aggressive management and "minding his own business."



Branch circuit conduit was run in the concrete floors to connect explosion-proof fixture fittings. Exposed conduit runs would have required more fittings and labor, because of the many beams involved.



Wall runs and column drops were stubbed down close to the face line and run to exposed explosion-proof switch and receptacle fittings.

WIRING layouts for new buildings of the hazardous location type require careful consideration as to how much of the system shall be concealed in concrete floors and masonry walls and how much shall be run exposed. Not only will costs of materials, mainly explosion-proof fittings, be affected by the layout, but also the labor cost.

A new plant at Lodi, N. J., for the International Ink Company, makers of flammable volatile inks for high-speed rotogravure newspaper printing presses, was laid out for explosion-proof wiring in its principal work areas. Here all the small branch circuit conduit was

Concealed or Explosion-



Large junction box fittings used for the telephone system were likewise left exposed, and extensions were made therefrom to surface type instruments and terminal cabinets.

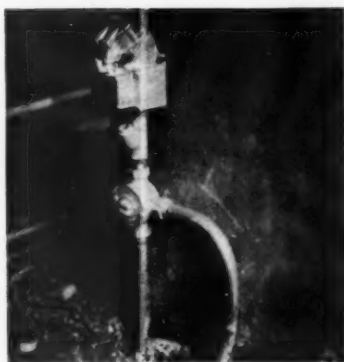
concealed in the concrete floors, while its feeders, motor circuits, wall outlets and switch controls were run exposed.

The concealment of lighting circuit runs had only one disadvantage as against several favorable conditions. Explosion-proof fittings for flush ceiling outlets must be installed in extremely rigid and perpendicular positions against the concrete form. This is necessary because the lower member or cover, screws into it without any leeway for leveling after the fitting is once cast in place. Furthermore, any seepage of concrete grout into the large internally threaded hub of the fitting body entails costly thread cleaning labor. So far no nailing or fastening ears have been provided for these fittings. As offsets to the foregoing chances of trouble because of improper care during the roughing-in stages, are the following advantages:

1. Greater labor cost to install exposed conduit on concrete ceilings in single scattered runs.
2. Additional explosion-proof fittings would be required in long exposed home runs, because sweeps and diagonal routes would not be permitted.
3. Additional fittings needed at beams, in running from bay to bay.

Wall outlets were run exposed on brick walls, concrete columns and machinery foundations from the point where their conduits emerged from the concrete floors. Because of the method chosen, the problem of semi-

Exposed Proof Wiring



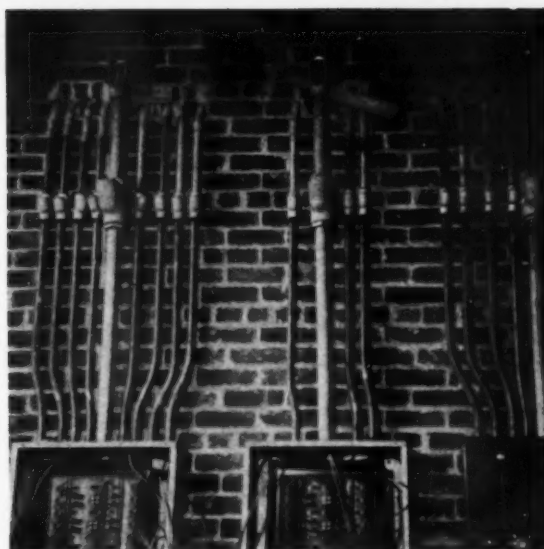
Polarized interlocking receptable fittings at various machinery foundations were installed exposed, their conduits being imbedded in the ground floor slab

concealment of fittings was avoided. Sealing fittings as are required at various outlets and panelboards were kept entirely exposed and most accessible for being filled with hot compound. The exacting requirements for aligning explosion-proof fittings in masonry walls or concrete columns to allow for the correct attachment of covers, was entirely eliminated because of exposed mountings.

The various feeder runs and motor circuits were laid out to employ exposed racks suspended from concrete inserts. Changes in motor circuits can thus more readily be made in the future as requirements change.

Except for buildings which demand completely concealed wiring, it would appear most advantageous to: (1) Expose all wall and column outlet fittings; (2) expose all vertical runs which require junction boxes or sealing fittings; (3) expose panelboards to provide maximum leeway for spreading out the conduit sealing fittings; and (4) conceal horizontal branch circuit and home run conduits. The choice between concealed or exposed feeders and motor circuits depends largely upon: (a) Whether they may be altered, moved or enlarged in the future; (b) if permanent, whether they can be grouped for cheap, exposed racking, or whether isolated or scattered runs cannot be more economically laid in the concrete form.

The location of control centers is usually dictated by operating convenience. In this plant the remote-



Sealing fittings as are required where entering switches, panelboards and similar devices must be made accessible for compounding. The surface layout in this control room for connecting three 16-circuit panelboards greatly simplified the job.



Switch gangs of the explosion-proof type differ somewhat from standard methods. Here three switches are wired from one overhead 1/2-in. stub-down that is divided through a junction box into two vertical runs. These connect a 1-gang and a 2-gang switch fitting with sealing fittings immediately above them. Exposed mountings simplified the installation of this typical occurrence of grouped fittings in many sections of the plant.

operated motor controls and lighting panelboards were surface-mounted in separate control rooms which opened only to the outside air. By locating these rooms near various load centers, the home runs were routed to minimize junction fittings. Because of surface type equipment, the various sealing fittings were easily spaced for accessibility.

This plant is being wired by the National Electric Company, Inc., Passaic, N. J.

Construction . .

Methods

Border Light Conduit Racking

Wall bracket supports were installed about 45 ft. above the stage floor to support the conduit runs between the borderlights and the stage switchboard in a new high school

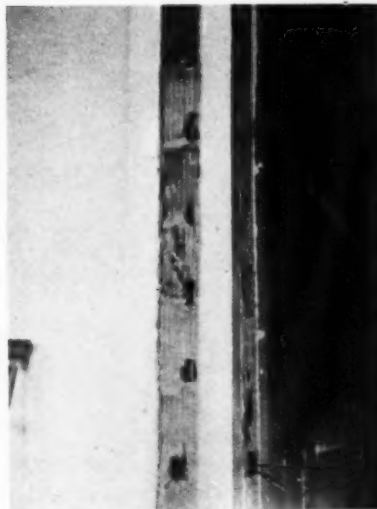


at Jamestown, N. Y. The four 1½-in., and two 1-in. conduits in this group were supported by triangular flat-iron brackets, which were secured to vitrified tile walls. This supporting method effected economies in the drilling of tile for the holes required for the brackets. Had these conduits been run flatwise along the tile wall, a larger amount of drilling and anchoring would have been required for this high-up operation. By running the conduits within these triangular brackets, the loose runs or lengths were kept in place without any danger of slipping off their support. After they were permanently aligned and stubbed into the gridiron junction boxes they were strapped in place. No offsets or throws were necessary in these runs because this racking and routing method permitted horizontal runs being maintained to their

gridiron termination. This wiring was installed by the Linquest Electric Company, Jamestown, N. Y.

Fishing Cable in Tile-Furred Steel Columns

In remodeling a commercial building at Buffalo, N. Y., numerous concealed wall outlets were added by fishing armored cable in the hollow cells of rough tile partitions and steel column furring. Because of plastic irregularities it was not possible to use oval under-plaster material. The Beacon Electrical Engineering and Construction Com-



pany was required by the architect to avoid weakening the tile construction by cutting only small hand holes or pockets into the cells at each mortar joint or course until the cable reached the new outlet opening. In the column that is shown, two cables were fished from outlets on the ceiling, one down to a switch on the front face of the column, and another to a 2-gang switch on the right face of the column. Each outlet box was temporarily blocked in place with wooden wedges to be later keyed into the broken tile by the

plasterer. This method left the original tile in place and weakened only slightly by the cutting of holes. The finished plaster is sure to cover smoothly, and is not likely to crackle, because of the tiles being left secure.

Two-Bolt Straps for Ganged Conduits

In routing ten ¾-in. and one ½-in. conduit from a power panel to a group of motor starters, these pipes were supported with special gang-straps made of 1-in. flat iron. These conduits were stacked in close formation and the straps were formed to an exact fit over their overall width. Only two togglebolts were thus required in the glazed tile wall

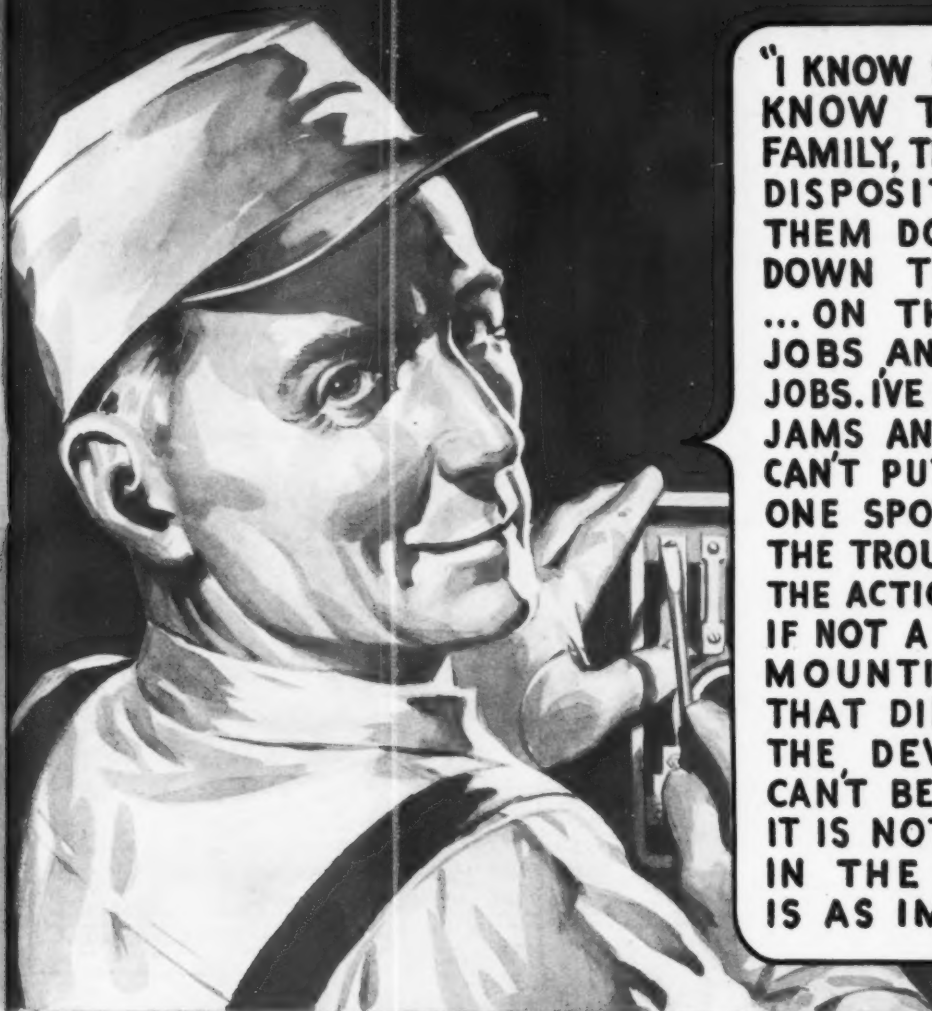


at each supporting point. This method was used by the Naumer Electric Company of New York, N. Y., in wiring a Brooklyn newspaper plant.

Odd-Job Pricing Sheet

The smaller jobs which must usually be priced quickly often involve a limited number of material items. A handy pricing sheet, which also serves as a check list for the requirements of such jobs is used by C. P. Bobe of the Paul Wendt Electric Company, St. Louis, Mo. It is printed on 8½-in. by 13½-in. sheets, with sixty-seven item lines, each 3/16 in. high. The principal material items are printed in, but spare lines are available for others. Likewise the sizes of certain items such as switches and fuses are left blank for filling in. If labor units are to be extended from the material quantities, a spare column at the right can be used in a pinch, while there is

AN ELECTRICIAN OUGHT TO KNOW SWITCHES



"I KNOW SAFETY SWITCHES LIKE I KNOW THE MEMBERS OF MY FAMILY, THEIR FEATURES AND THEIR DISPOSITIONS. I'VE WATCHED THEM DO THEIR ON'S AND OFF'S DOWN THROUGH THE YEARS ... ON THE HARD, DEMANDING JOBS AND ON THE QUIET, EASY JOBS. I'VE SEEN ENOUGH PRODUCTION JAMS AND GRIEF TO KNOW YOU CAN'T PUT YOUR FINGER ON ANY ONE SPOT AND SAY, 'HERE'S WHERE THE TROUBLE WILL START.' IT MAY BE THE ACTION, IT MAY BE THE CASE; IF NOT A WASHER, MAYBE A MOUNTING BOSS. EVEN A DOOR THAT DIDN'T CLOSE HAS RAISED THE DEVIL. A SAFETY SWITCH JUST CAN'T BE SLIGHTED IN ANY DETAIL. IT IS NOTHING BUT DETAILS, AND IN THE FINAL ANALYSIS, EACH IS AS IMPORTANT AS THE REST."

Who Cares About a Corner?

PERHAPS even the user himself doesn't care very much whether the corners of his safety switch case are tight and square. Perhaps it doesn't matter to him whether the door shuts or not.

But it matters to Cutler-Hammer. There's an inescapable logic in the statement "a safety switch is the exact sum of its parts," and C-H is building for not less than perfection.

But look at the matter from your side. How do you know what details to slight?

Isn't it true that accident or damage involving a switch has resulted from the oddest causes, from unforeseeable beginnings? How then know what details to slight?

Instead, C-H brings equal perfection to every detail. And it at least pays C-H, to judge from the number of C-H Switches handled by alert contractors and independent wholesalers everywhere. CUTLER-HAMMER, Inc., Pioneer Manufacturers of Electric Control Apparatus, 1306 St. Paul Avenue, Milwaukee, Wis.

● The C-H line includes all types and sizes of Standard, Weatherproof and Explosion-Proof Safety Switches, and Range Switches and Service Equipment for every locality — all built to the famous C-H Control Leadership Standards.



CUTLER-HAMMER  SAFETY SWITCHES

NEWS FROM WIREMOLD

"THE BUSINESS BOOSTER FOR CONTRACTORS!"

THE WIREMOLD COMPANY

HARTFORD, CONN., U. S. A.

At Last!

*A practical over-floor raceway!
Simple! Sturdy! Trip-Proof!
Trouble-Proof! Safe!*

Equally useful for either low potential or POWER and LIGHT wires—with advantages so striking and so self-evident that your prospective customers will buy it on sight. A characteristic Wiremold achievement—so sensible in design, so durable in construction, so well adapted to its purpose, that it will give permanent satisfaction in use.

The NEW "PANCAKE" WIREMOLD

There is a great and pressing need for this really practical and thoroughly satisfactory over-floor raceway. We have been repeatedly requested by contractors and central station lighting men to provide some method of connecting up desk lamps and other electrified equipment standing some distance away from electrical outlets—without allowing loose wires to lie dangerously about on the floor. Their customers are clamoring for it. And this is it!

1. Easy to sell!
2. Just as easy to install!
3. Creates new business for the contractor!
4. Gives control of it to the contractor!

The simple fittings and easy method of installing is shown in adjacent columns. The need it fills and how well it fills are illustrated and summarized. You can see for yourself how well it exemplifies the well known trade truth.

"Wiremold HELPS the Contractor!"

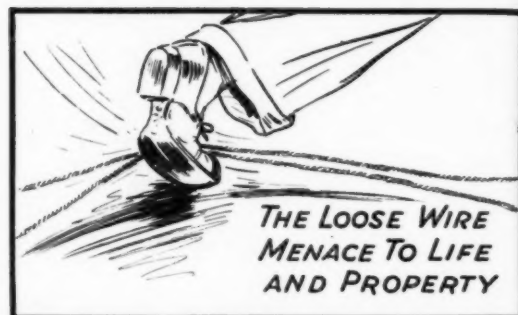


DUPLEX RECEPTACLE

Catalog No. 1543

Quick, safe, sure, trouble-proof connection for desk lamps and appliances, etc., in home or office.

SIMPLE Wiremen to Install



WHY they NEED IT!

BEFORE this really practical over-floor raceway is installed:

1. Loose wires constitute a real danger. There is a definite liability, if people are injured by tripping over them.
2. Telephone and buzzer service is subject to frequent interruption—usually at the worst possible time.
3. Power and Light service is jeopardized. Blown fuses interrupt work.
4. There is a real fire hazard—a persistent threat to the continued operation of business. Vital business records are constantly exposed to destruction.



JUNCTION BOX

Catalog No. 1542

Equally useful for tee, elbow or cross—or for connection to floor outlet boxes.



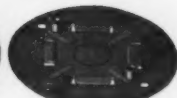
← as is for 200 →
← break off for 500 →
← break off for 700 →

THREE WAY
COMBINATION

INTERNAL ELBOW

Catalog No. 1517A

Provides a simple connection for 200, 500 or 700 Wiremold.



TELEPHONE OUTLET

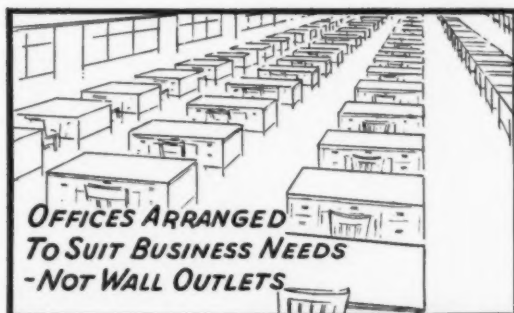
Catalog No. 1524

A practical answer to the demand for safe and convenient connections — a n d uninterrupted service.

E F I T T I N G S ! *Easy for skilled*
to Install! Easy to sell the customer

PANCAKE WIREMOLD

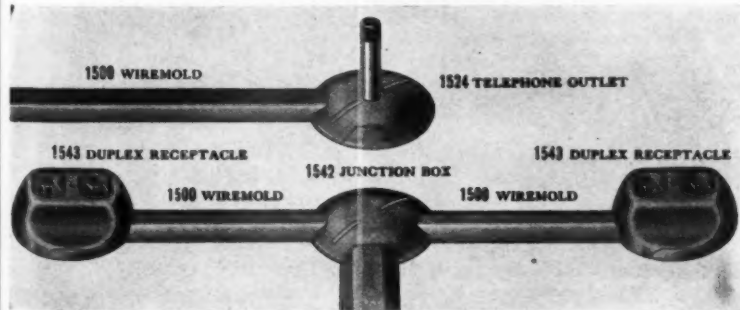
THE SAFE OVER-FLOOR RACEWAY
"LIES FLAT AS A PANCAKE — WITH THIN, SLOPING EDGES"



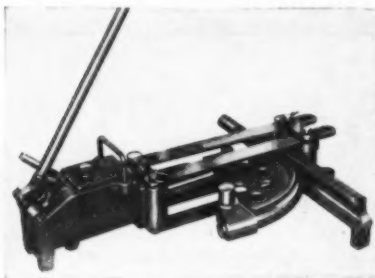
WHY they LIKE IT!

AFTER this really practical over-floor raceway is installed:

1. Offices may be arranged for convenience and comfort—because outlets may be placed where needed.
2. Aisles are kept clean—free of obstructions. Wires are still on the floor, but not in the way!
3. The usefulness of office facilities is multiplied—with resultant gain in clerical efficiency.
4. No danger of AMATEUR TAMPERING with power or service wires—by stenographers, clerks or office boys.



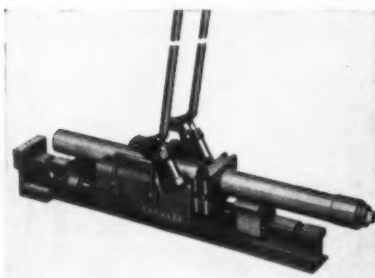
With general business conditions steadily getting better, it is assumed that building activity will increase sharply during 1936. That means more business for the electrical contractor. It means, too, that the contractors who are best prepared to compete will get most of the business and show the best profit. Those contractors will take advantage of the labor-saving possibilities of Greenlee Tools. If you are not prepared to do so, it will pay you to place yourself in that position, without delay. Complete information will be sent gladly. Just mark the coupon and mail it now.



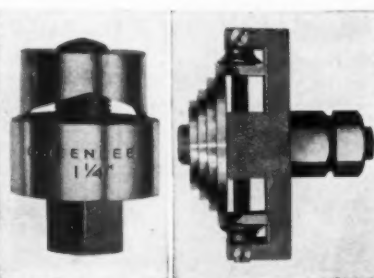
Above is the Greenlee No. 770-T Bender for thin-wall steel conduit. Same as No. 770, but with different attachments. Bends quickly and easily, without crushing. Complete forward movement of the ram makes full 90-degree bend. Will handle 1½, 1½ and 2-inch conduit.



Above is the Greenlee Hydraulic Bender for rigid conduit. It is simple to operate, easily portable, and makes bends quicker and better than by other methods. No. 770 bends all sizes from 1½ to 3-inch. The large bender, No. 775, handles all sizes from 2½ to 4½-inch.



Greenlee No. 790 Hydraulic Pipe Pusher saves money on underground installation of pipe and conduit. Eliminates much trenching, back-filling, etc., and saves lawns and pavement. Easy for one man to operate. Will exert maximum pressure of 40,000 pounds on pipe clamp. Capacity for pipe from 1½ to 4-inch.



Greenlee Knockout Tools enlarge holes for conduit quickly and accurately, without reaming or filing. Convenient to operate. Punches come in two sets. No. 735 is for $\frac{1}{4}$, $\frac{3}{8}$, 1 and 1½-inch conduit, while No. 737 is for 1½ and 2-inch conduit. No. 740 Cutter will enlarge holes for 1½, 2, 2½ and 3-inch conduit.

***** Mail This Coupon To-day *****

Please send information on the following tools:

- ☐ Rigid Conduit Benders ☐ Thin-Wall Conduit Benders ☐ Pipe Pushers
☐ Knockout Tools ☐ Joist Borers ☐ Electricians' Bits ☐ Bit Extensions

Name Address

City State

My lobster is **3-36**

CONDUIT BENDERS • KNOCKOUT TOOLS • PIPE PUSHERS • BORING TOOLS

AMOUNT _____

[illegible][illegible]

space at the left of the "quantity" column for jotting the labor units which are chosen. Job cost summary lines are provided at the bottom of the pricing sheet.

Setting Grouped Outlets in Tile Walls

In order to set a complicated network of forty-seven square outlet boxes at their exact positions beside the locations for three projectors in



a new theatre it was necessary to knock away most of the inner section of the tile wall in the projection booth. Because this left the tile in a weakened condition, the outlets were grouted in place with cement

Electrical Contracting, March 1936

IT'S MODERN!



The NEW BULL DOG

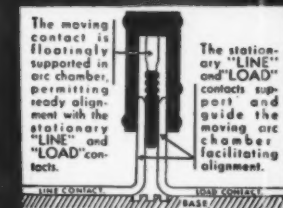
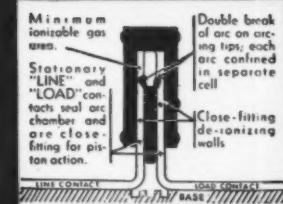
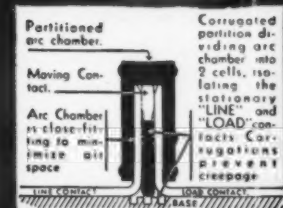
Vacu-Break

SAFETY SWITCH

Sets A New Standard of Performance in Circuit Rupturing—

The amazing VACU-BREAK principle of arc control is startling in its simplicity yet most effective in performance.

Notable features incorporated in VACU-BREAK Safety Switches include: Better Rupturing Performance—Double Sealed, minimum Arc—Enclosed Moving and Stationary self-aligning Contacts—Better Conductivity and sturdy yet simple construction with fewer parts.



Full "ON" Position

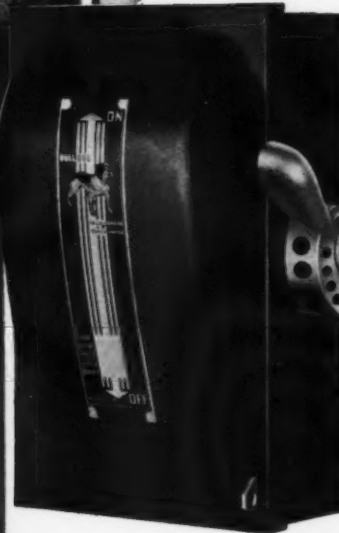
The partitioned arc chamber, with moving contact floatingly supported thereon, moves on the stationary self-aligning "LINE" and "LOAD" contacts.

Rupturing The Circuit

The switch upward movement of the housing on the close-fitting stationary contacts creates a piston action tending to evacuate air from the arc chamber.

Full "OFF" Position

The stationary "LINE" and "LOAD" contacts support and guide the moving arc chamber, facilitating alignment.



MODERN
STYLED
CABINETS

In
COMPACT SIZE

Compactness in BULL DOG VACU-BREAK switches is not limited to the type "A" line but is a feature of 3 COMPLETE LINES, including every price range. ALL VACU-BREAK Switches are appropriately housed in stylined cabinets with handles to match—the improved outward form reflecting the finer inward quality.



Solderless Wire Grips

All "LINE" and "LOAD" wiring terminals in VACU-BREAK Switches are solderless wire grips. They save wiring time and soldering material and make a cleaner, more workmanlike job while insuring better contact.

Ask Your Jobber For Details and Prices



BULL DOG ELECTRIC PRODUCTS CO
DETROIT, U. S. A.

IN CANADA
BULL DOG ELECTRIC PRODUCTS OF CANADA, Ltd., TORONTO, ONT.

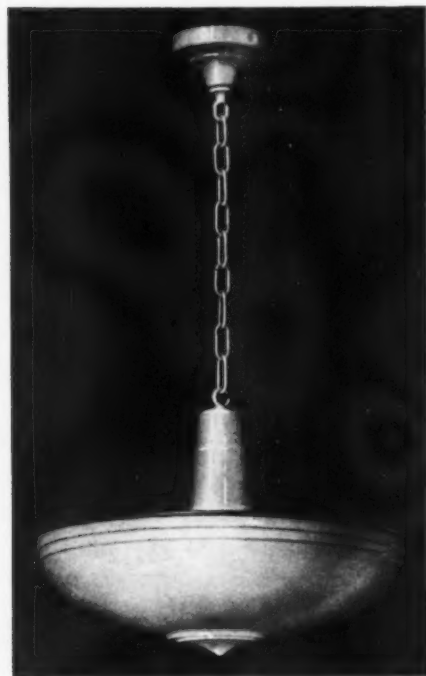
FOR QUICK SALES GREATER PROFITS

Sell this quality SIGHT-CRAFT Line

Contractors selling SIGHT-CRAFT lighting are enjoying greater sales and profits. Users of SIGHT-CRAFT lighting are profiting from greater efficiency of employees. SIGHT-CRAFT luminaires have greater efficiency and durability due to their VITROLUX* finish and correct design.

*VITROLUX is an exclusive enameling process consisting of 3 coats of special porcelain fired on specially treated enameling iron at 1500° F.

Your customers will especially appreciate the efficiency, low first cost and low maintenance of this "APOLLO" LUMINAIRE. Order a sample from your wholesaler and become acquainted with its greater profit margin.



SAN FRANCISCO
154 Eighth Street

SMOOT-HOLMAN COMPANY

INGLEWOOD, CALIFORNIA

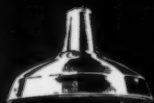
NEW YORK
10 Jones Street

SEATTLE
532 First Ave. So.

SIGHT-CRAFT INDUSTRIAL UNITS

HAVE EXCLUSIVE
"VITROLUX"
FINISH

Insuring
long, durable and efficient service under
the most severe atmospheric conditions.



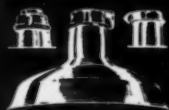
STANDARD DOME
Socket Type



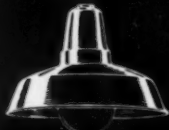
DEEP BOWL
Threaded Neck, Type "RR"



STANDARD DOME
Threaded Neck, Type "RR"



STANDARD DOME
With Separable Fitting



Dust and Vaporproof
REFLECTORS
NEC Standard



UTILITY LIGHT
For Gardens, Industrial Yards,
Garages and General
Floodlighting

mortar rather than risk punching holes through the remaining tile web for supporting the boxes with toggle bolts or tie-wires. The exposed conduits and grouted-in outlet boxes may be seen at the right, while a rough mortar fill which has already been applied by the plasterers at the extreme left, will result in a concealed conduit installation and flush outlets. This work was done by the Arc Electrical Construction Company, New York, N. Y.

Inconspicuous Window Feeder

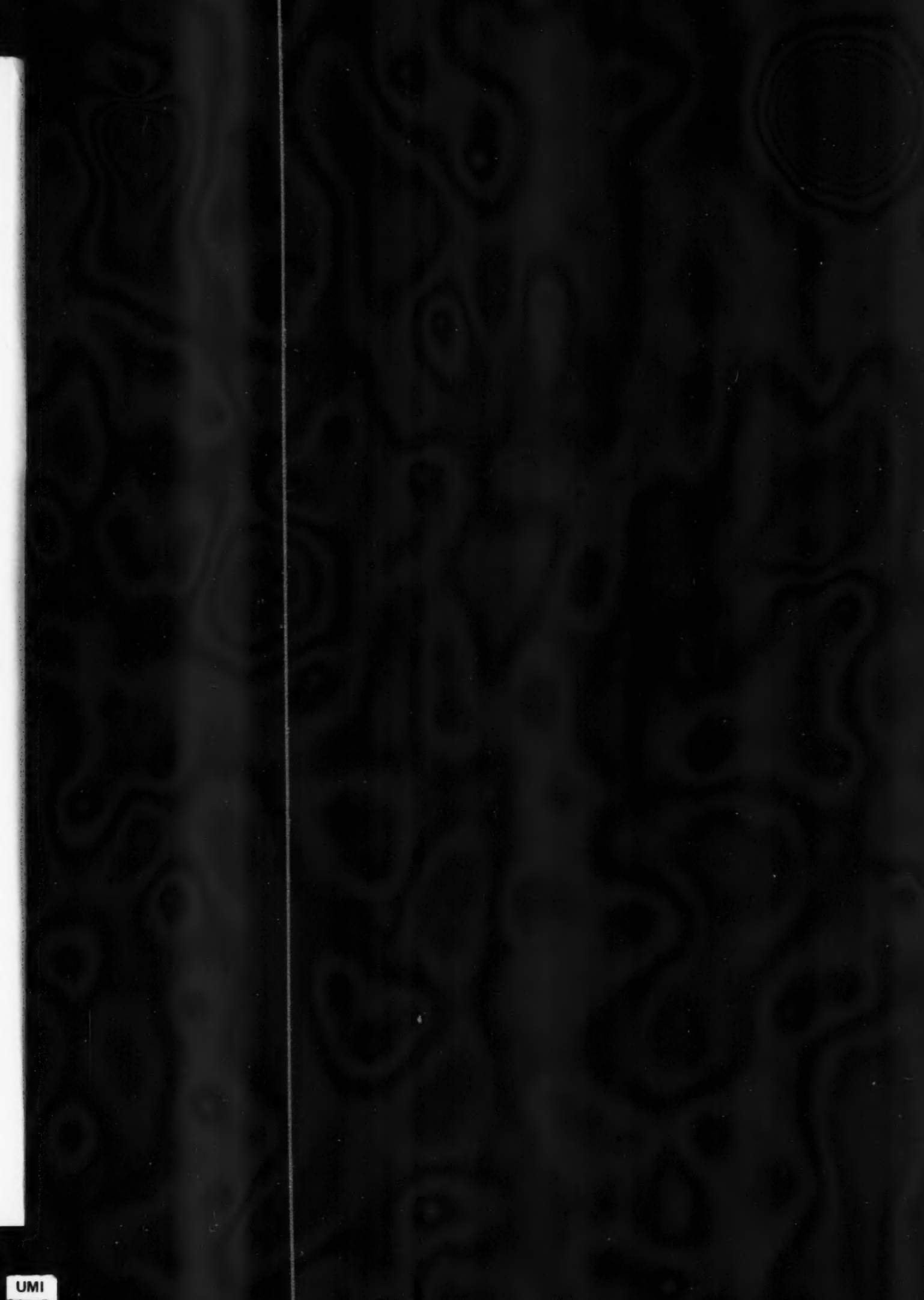
A method for connecting concealed conduit to exposed window reflector raceway as recently employed by the Charles D. Stempfle Electric Com-



pany, Elmira, N. Y., dispensed with the conventional junction box and flexible, or looped connection. A concealed 1/2-in. home run conduit was elled out of the wall at the exact height for a threaded conduit fitting to be nipped into the back of this raceway. From this point a 15-ft. run of bracket-supported raceway served seven 100-watt reflectors.

Aligning Conduits on Loose Fill

Conduit stubs which terminated at a motor control center were kept in correct position with wooden alignment and fastening blocks. Good supports were needed at this point because the long runs to an adjoining pump room were laid upon earth fill that offered little means of fastening. An opening had been provided in the control room wall at the floor line that provided clearance for stubbing up eight 1-in. conduit ells to line up with the bottom of a wireway. Two pieces of 1/2-in. lumber



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NEWS

General Cable Research Development Shown

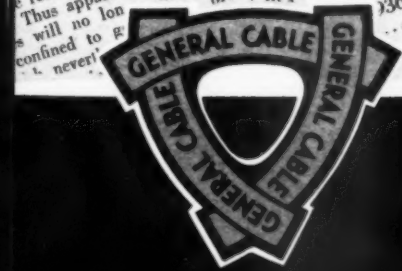
Building Modern Presents Opportunity

BUILDING IS EXPECTED TO SHOW 1936 GAIN OF 25 TO 50 PER CENT

In normal times considerably more than \$6,000,000,000 is spent in a year for building construction in the United States, this being the average of contracts. Based on former averages, the country is about three years in arrears in its building operations — that is, the effect has been practically the same as though building had ceased altogether for that length of time. Hence the gain in home building in 1935 over 1934 was about 89 per cent. Commercial building was up about 11 per cent from 1934; while the values of new construction contracts were not quite up to 1934 for either industrial or public utilities. The very size of the building industry under normal condition the fact that it has been among the hardest hit by the depression to the belief that it must eventually show an enormous expansion from leading engineers and contractors indicate an increase of 25 to 50 per cent in 1936. It is estimated 600,000 new units are needed at a cost of \$2,500,000,000 for old houses, and new population. Here built, and 1936:

Level

raging prospects for any one region. industry generally, farm, to the utility, classes of business, qually bright for bet- the months to come. budgets for new con- neral years past. Public shing up with the indus- only answer is increased service. Maintenance during the worst recent depression, will be e recent apparatus and equip- he almost



Introducing
GENERAL CABLE
GUARDIAN
BUILDING WIRE
 AND CABLE

GENERAL CABLE CORPORATION

Executive Offices: 420 LEXINGTON AVE., NEW YORK

Sales Offices: ATLANTA • BOSTON • BUFFALO • CHICAGO • CLEVELAND • DALLAS • DETROIT • LOS ANGELES
 NEW YORK • PHILADELPHIA • PITTSBURGH • ROME • SAN FRANCISCO • ST. LOUIS • SEATTLE • WASHINGTON, D. C.

6 Great Advantages

IDEAL CONDUCTOR MATERIAL

Soft, full gauge Copper Conductors, well tinned, are employed in the manufacture of all General Cable GUARDIAN Building Wires and Cables. A definite advantage.

LONG-LIFE INSULATION

The latest developments in General Cable rubber compounds are reflected in the insulation. The exceptional aging quality contributes to long life.

FREE STRIPPING

★ With GUARDIAN Building Wire the insulation strips off readily, to leave a clean bright conductor for soldering. A practical advantage the electrician will appreciate.

FLAME RETARDING—MOISTURE RESISTING

GUARDIAN Building Wires are a real contribution toward permanent safety. In addition to its moisture-resisting qualities the wire will neither support nor carry a flame.

FADELESS COLORS

Colors do not fade on GUARDIAN Building Wires and Cables. Can be easily cleaned if they become soiled. Clean to handle. Finish does not come off on hands.

EASY TO PULL

Small uniform diameter and hard lubricated surface make for easy installation. No adhesion to other conductors or raceway walls. Lower pulling stress on copper and insulation.

GUARDIAN

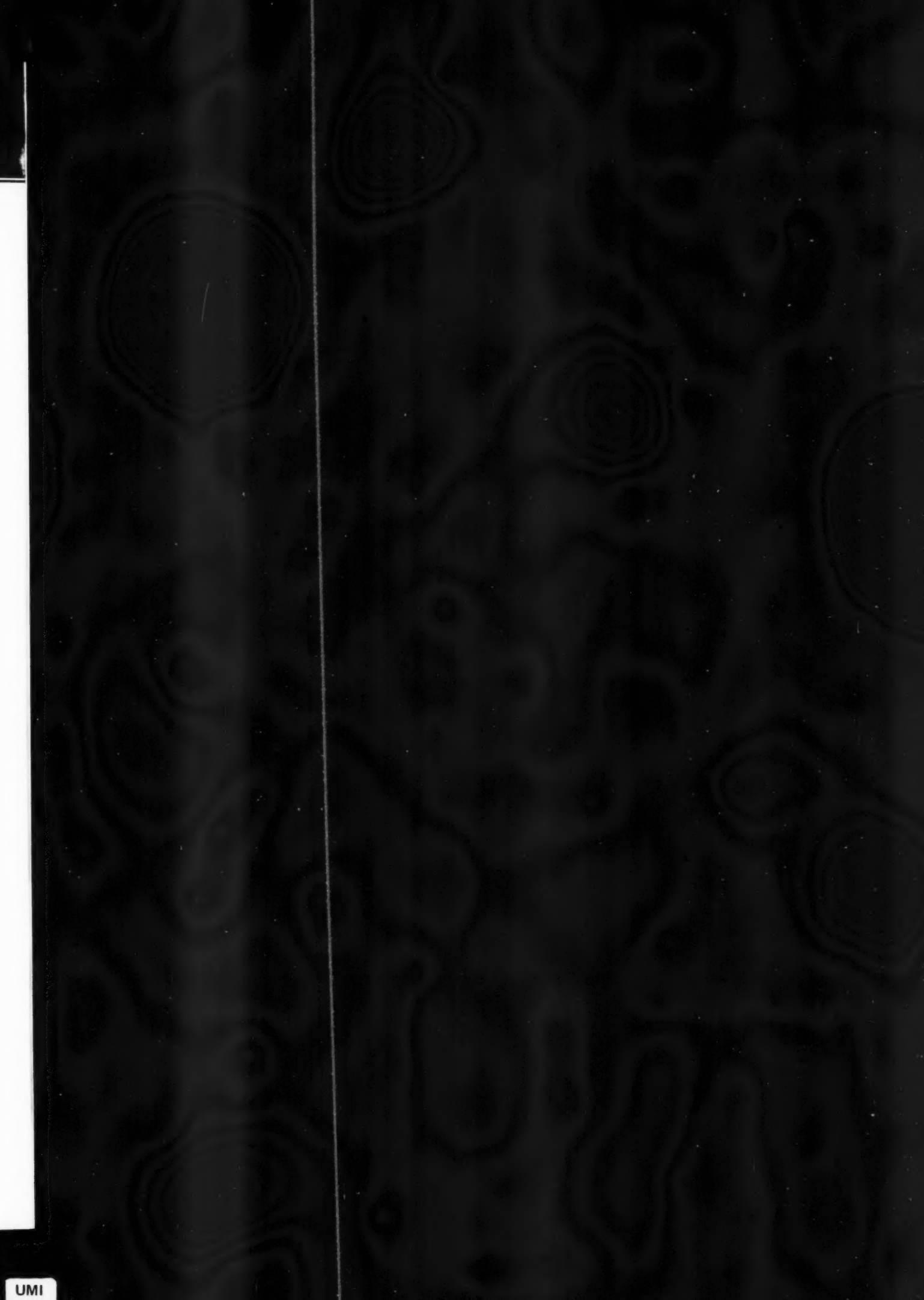
BUILDING WIRE AND CABLE

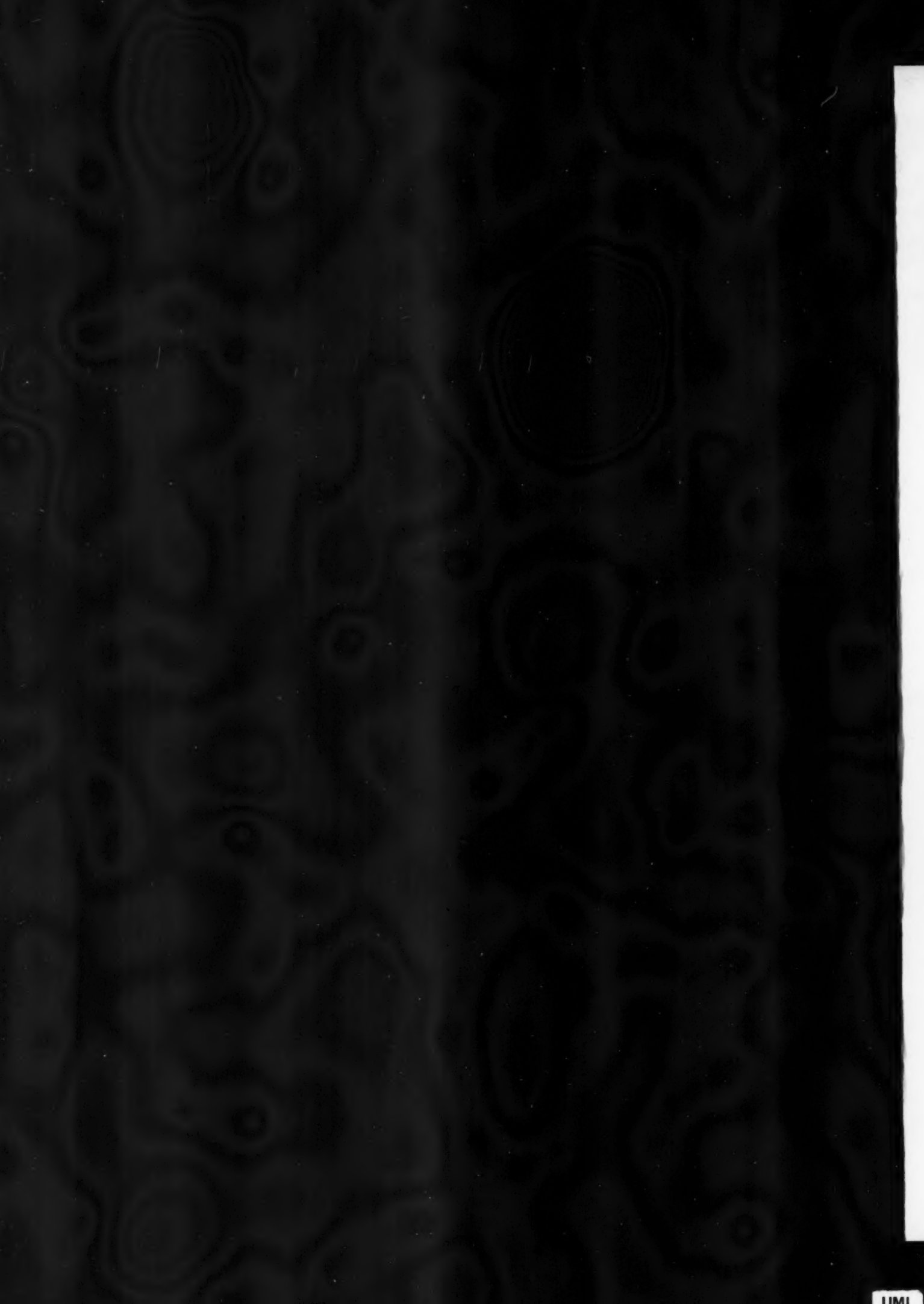
CODE, INTERMEDIATE
AND 30%
BRAIDED OR LEADED

A
GENERAL CABLE
PRODUCT



Patent Numbers
1,651,925 — 1,722,436
1,765,908 — 1,798,480
1,416,790 — 1,536,549
Other Patents Pending
General Cable Corp.
Licence





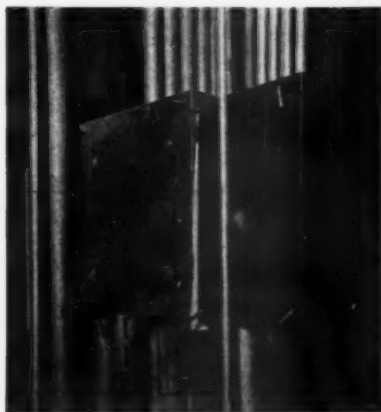
which were temporarily nailed to the brick wall provided a straight-edge for these stubs. Nails and stove wire were used to secure the loose



conduits until the concrete floor was patched. This installation by the National Electric Company, Inc., Passaic, N. J., was made in an industrial plant at Lodi, N. J.

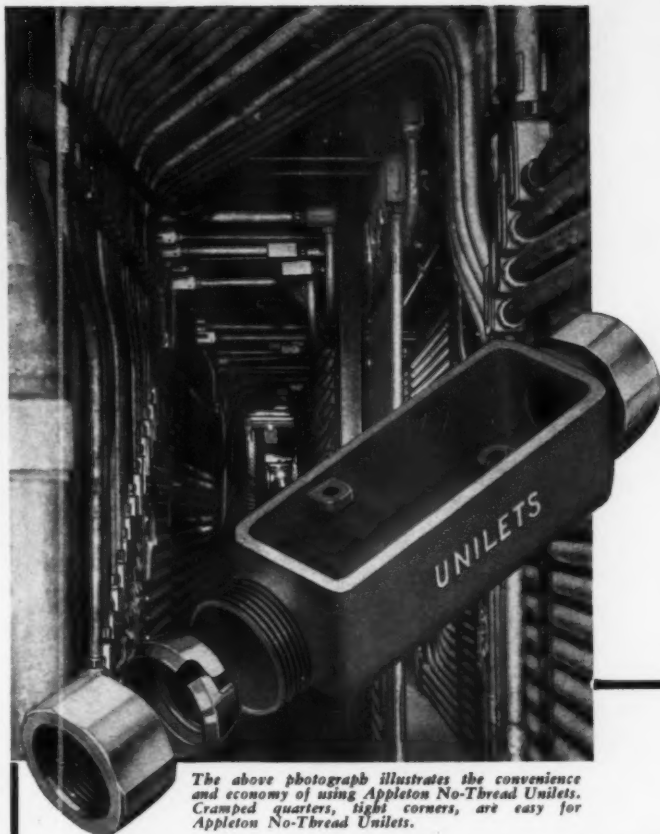
Anchor Bolts for Surface Cabinets

Inexpensive 3-in. rods are made up to serve as wall anchors for "wobbly" surface-mounted cabinets on new construction jobs that are wired by Joseph Newman, Inc., of Jersey City, N. J. The two cabinets that appear in the photo will be backed up later by a 4-in. tile partition. Because they are each fed by single conduit runs from the riser shaft, there is



nothing available to provide a good support. Each cabinet was therefore provided with four L-shaped anchors made from pieces of 3-in. iron rod. The long ends are provided with a 2-in. thread and nut. These anchors are left hanging out of the back of the cabinets to be tiled in place. The nuts are left backed off to permit a full 2 in. take-up if necessary. When the tile wall is completed the nuts are drawn tight, thus cinching the cabinet to the wall without the need of through-bolts or toggles.

Electrical Contracting, March 1936



The above photograph illustrates the convenience and economy of using Appleton No-Thread Unilets. Cramped quarters, tight corners, are easy for Appleton No-Thread Unilets.

THREE REASONS WHY it pays to use APPLETON NO-THREAD UNILETS

- Ease of Installation
- Lifetime of Service
- Strength combined with Light Weight

These are the things you will appreciate. Appleton No-Thread Unilets reduce costs by shortening the time it takes to make an installation. The conduit is inserted in the Unilet, the hexagonal nut tightened and the job is done . . . quickly and permanently.

A lifetime of service is insured because Unilets are made of malleable iron and they are coated with cadmium to resist rust and corrosion.

APPLETON ELECTRIC COMPANY
1704 Wellington Avenue Chicago, U. S. A.
New York—76 Ninth Avenue Philadelphia—401 North Broad St. San Francisco—655 Minna Street
Los Angeles—340 Azusa St. Detroit—7621 Woodward Ave. St. Louis—420 Frisco Building

APPLETON

No-Thread Malleable

The Original Threadless Conduit Fittings

UNILETS

Reg. U. S. Pat. Off.



Type "T"
No-Thread Unilet



Type "C"
No-Thread Unilet



Type "LL"
No-Thread Unilet



No-Thread Coupling

BWH TAPES



Tape is used by the roll; yet for many years it has been sold by the pound. Weight does not contribute to economy. It is footage that counts—and that's why B.W.H. Tapes, made and used by the roll, are also sold by the roll.

When you buy B.W.H. Tapes you get guaranteed footage. A roll bought today or six months from now gives you exactly what you pay for—a definite quantity of tape, always the same, and always identical in character.

If you agree with us that footage rather than weight is what really counts in tape, order B.W.H. brands of Friction Tape or Splicing Compound. This insures your receiving maximum tape value as well as a brand nationally known and made by the oldest tape manufacturer in the industry.

BOSTON WOVEN HOSE & RUBBER CO.

FRICTION TAPE



All B.W.H. Friction Tapes are built on strong, closely woven sheeting, thoroughly impregnated with live rubber friction of strong, adhesive quality. Bull Dog Tape, nationally advertised for many years, is identified everywhere by the well known slogan — "It Sticks - It Holds - It Lasts".

RUBBER TAPE



B.W.H. Rubber Tapes are made of exceptionally high grade unvulcanized compound, accurately cut and tightly wound between layers of Holland sheeting,—always moist and ready for instant service.

CAMBRIDGE, MASS.

Service Shop...

Practice.....

Compact Small Motor Testing Outfit

Quick and accurate load tests and adjustments are made upon small motors that have been repaired by the Dayton, (Ohio) Electric Service Company. An adjustable motor mounting platform, a visual motor torque scale, and a time-saving regulating and plugging panel provide the principal parts of this assembly. Motors to be tested are direct-coupled to a d.c. torque motor that has four separate windings, and which is regulated by means of a panel-mounted auxiliary resistor. Either direction of testing rotation produces the same deflection or downward pull upon a charted scale dial above the torque motor. The scale has been bracketed so as to center directly over this motor. It has a chart which registers over its 0 to 20-lb. range a specific hp. value at each of three motor speeds. There are three circular lines representing 3,600, 1,750 and 1,150 R.P.M. These are plotted in fractions of hp. and give an instant visual record of performance to the tester. The maximum capacity of this outfit is 5 hp. at 3,600 R.P.M.

The motor mounting bed plate is supported by four sliding posts and is raised and lowered by means of a vertical screw which has a turn-wheel beneath the bench. Bolting holes are provided in the bed-plate for motor fastening.

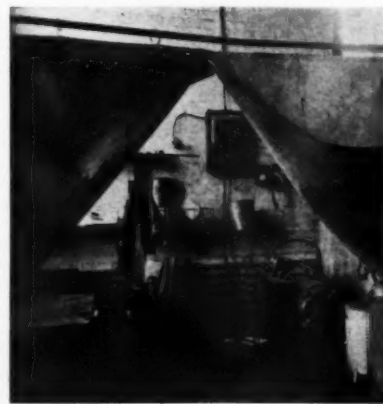
To facilitate adjustments of centrifugal switches, the motor circuit has been provided with a magnetic contactor which serves as an automatic interrupter, when desired. An oscillating fan motor and mechanism has been equipped with a contact drum to interrupt the contactor coil fourteen times per minute. Thus it is not necessary for a workman to operate a manual switch while adjusting motors for correct centrifugal switch action.

The upper section of the testing panel has an ammeter and shunting jack at the upper left; a 3-circuit snap switch for re-connecting the torque motor windings; interrupter drum motor switch; and main circuit control snap switch. A horizontal row of eight receptacles are back connected for operation in conjunction with three flexible plugging

leads and attachment plugs. The left lead is used for plugging into 110 or 220 volt d.c. supply to the torque motor. The center four receptacles and middle lead are for supplying 110 or 220 volts d.c. or a.c. to the motor being tested. When d.c. motors are tested the starting rheostat is used also. The two receptacles at the extreme right are for 3-phase or d.c. motor circuits leading out to the motor terminals. A back-mounted resistor in the lower center is used for the torque motor.

Inexpensive Booth for Isolating Welders

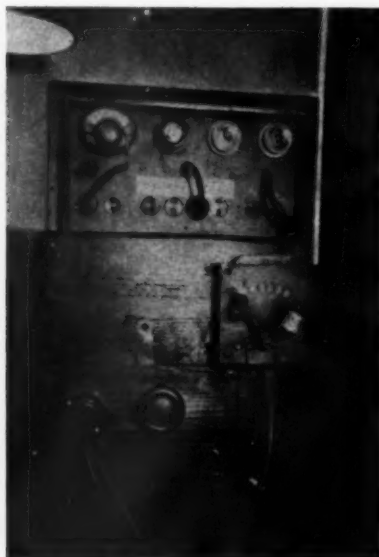
Because the flame from welding operations was found objectionable and disturbing to other shop workmen, the Electric Service Repair Company, Paterson, N. J., provided



a canvas-walled booth for isolating this work. The arc and acetylene welding equipment is kept in an 8-ft. by 12-ft. space with all the equipment and supplies, such as welding rods, hoods, goggles, etc., in place. A heavy canvas curtain 7 ft. high is supported on pipe rails to form a corner room that has outside light from two exposures. Steel plates were placed on the wood floor as a protection against molten metals.



Torque measurement



Testing panel

Swinging Belt-Driven Balancing Stand

For checking rotor and armature balance, the Berger Bros. Electric Motors, Inc., Rochester, N. Y., built a balancing stand which includes a motor-driven belt for rotating the unit under test. This belt drive is suspended to raise up in a position to permit raising or lowering heavy units upon the balancer. Only one hand is needed to lower it upon the

SANGAMO



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THE electrical contractor is becoming more and more quality conscious, as his customers demand absolute dependability and unfailing service in the equipment he installs. He knows that true economy lies in quality equipment.

That's why more and more contractors are using Sangamo Time-Switches as the most economical and most dependable of all time-switches. Sangamo's stand up under all conditions of service, in all weather, delivering the accurate and trouble free service that can be expected of quality equipment.

It's true economy to buy the best and in a time-switch that means Sangamo.

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^a Type VW — electrically wound, not dependent upon regulated frequency (10 hour reserve, in the event of circuit interruption) — on/off device for eliminating day or days — for controlling sign or window lighting.



SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

ALL-WAYS



ALWAYS and in fact under all conditions there is a shape or size of Separable reflector to fulfill every requirement and meet every lighting need. Not only Separable reflectors but every type of modern lighting equipment is listed in our complete catalog.

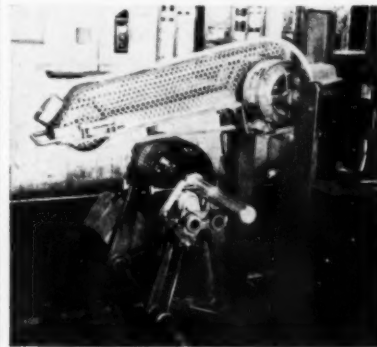
WRITE FOR CATALOG 36

GOODRICH

ELECTRIC COMPANY

GENERAL OFFICES & FACTORY — 2901-35 NORTH OAKLEY AVENUE, CHICAGO
OFFICES IN ALL PRINCIPAL CITIES

rotor, and a motor starting button is located at the lifting handle for operation with one finger of that hand. Belt pressure is only applied until the desired rotating speed has



been obtained. A 1 hp., 1800 r.p.m. contactor-controlled motor drive is used. A rugged steel frame supports the balancing bearings and mounting pedestals. Special floating ball-bearings are provided under the main roller bed plates to register the vibrations or deflections caused by very slightly unbalanced conditions. An adjustable steel pointer or marker is provided for use with "prussian blue" shaft marking, but ordinary chalk scoring is found equally as satisfactory in making tests.

Truck Type Growler Hoist

A heavy-duty growler that is used in the service shop of Young and Maue, Jersey City, N. J., is mounted on a steel rack with truck wheels,



and has a ratcheted hand hoist for elevating the growler jaws to any desired level. This equipment can be rolled to the various benches or floor stands in the shop for testing armatures or rotors. A $\frac{1}{2}$ -in. steel





Put away your files and sand-paper! They cannot help the contacts of the Bulletin 709 solenoid starter—they only harm them. The only maintenance these starters require is an occasional inspection. Any oxides that may form on their silver-alloy contacts will not interfere with their operation. Furthermore, as contact life is not filed away, contacts last many times as long as ordinary copper-to-copper contacts.

Bulletin 709 starters make neat, attractive installations. Their low drop-out voltage prevents unnecessary shut-downs when line conditions are bad. Currents of ten times their maximum horsepower rating can be safely handled.

Bulletin 709 starters are available in three sizes for motors up to 30 hp, 220 v; 50 hp, 440-550 v.

Send for the latest descriptive literature on the Bulletin 709.

Allen-Bradley Company, 1307 S. First Street, Milwaukee, Wisconsin



ALLEN-BRADLEY
BULLETIN 709 SOLENOID STARTERS

Bulletin 709 Advantages

- Silver-alloy contacts never need to be filed or “dressed”
- Compact starter mechanism provides generous space for wiring in the cabinet
- White cabinet interiors reflect light and give better illumination in dark places
- All wiring connections are visible and accessible from the front of starter cabinet
- Knockouts are provided on all sides and back of cabinet
- Cabinet cover is completely removable, permitting easy access to starter mechanism





● *Kansas City Office Building wired in Electrunit Steeltubes.*

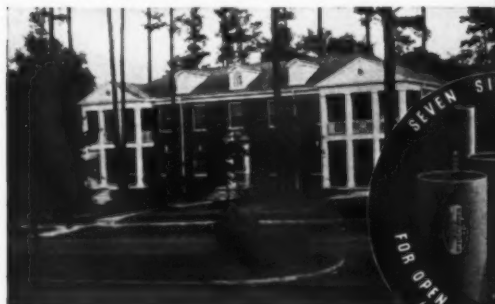
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BUILDING
OWNERS



● *St. Paul, Minn., Bank Building—185,000 feet of Electrunit Steeltubes.*



● *Cleveland's new \$3,000,000 Post Office. 300,000 feet of Electrunit Steeltubes used.*



● *Electrunit Steeltubes protects wiring in this Jackson, Miss., Apartment Building.*



● *Modern type residence equipped with Electrunit Steeltubes.*

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IN BUILDINGS OF EVERY TYPE

ELECTRUNITE Steeltubes

REG. U. S. PATENT OFFICE

IS AFFORDING PROTECTION
TO ELECTRICAL WIRING

More than a hundred million feet of this modern electrical metallic tubing are giving complete mechanical and electrical protection to wiring in more than 100,000 homes, office buildings, municipal buildings, hotels, hospitals and other types of structures.

Electrunite Steeltubes simplifies wiring. It cuts and bends easily. It requires no threading. Three simple fittings adapt it to any work. It speeds erection. It costs less. It takes up less space in floors, walls and ceilings. It is easier for pulling or pushing cable. It is not a substitute for any other protective raceway—it is the original electrical metallic tubing developed under the Johnston process of electrical welding to serve as a raceway for wires, offering all of the mechanical and electrical protection that is necessary in such a system.

Contractors can obtain Electrunite Steeltubes without delay through one of the 320 licensed distributors—including all of the branches of the Graybar Electric Company and Westinghouse Electric Supply Company—now carrying it in stock in all distribution centers.

Electrical Division
Steel and Tubes Inc.
WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING
CLEVELAND . . . OHIO

When writing Steel and Tubes, Inc. for further information, please address Department EC.

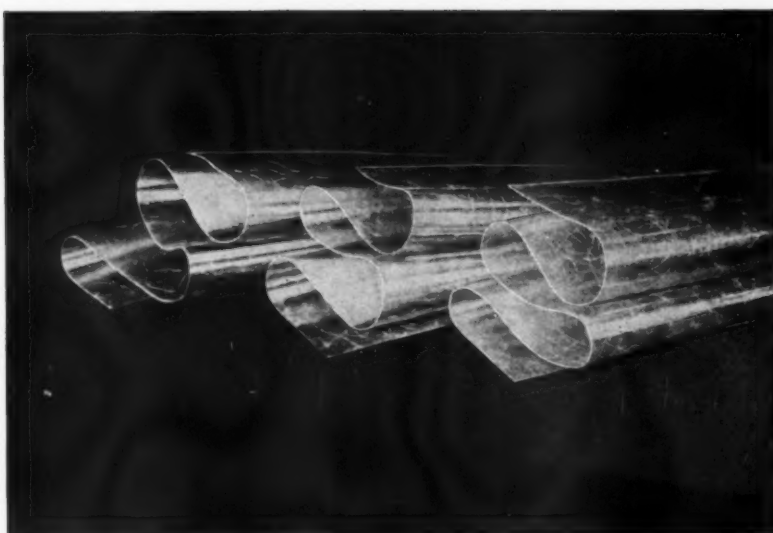


**FOLLOW THESE SPECIFICATIONS
AS GIVEN IN SWEET'S CATALOG**

*Knurled inside finish available in 1/2", 3/4" and 1" sizes.
Patent No. 1,962,876*

All electrical conductors shall be enclosed in Rigid Electrunite Steeltubes Electrical Metallic Tubing, as manufactured by Steel and Tubes, Inc., Cleveland, Ohio, sizes 1/2 in. to 2 in. inclusive. Tubing shall be made from S.A.E. 1010 flat cold rolled steel, galvanized and manufactured in accordance with Underwriters' Laboratories Standards, and so labeled.

Electrunite Steeltubes shall have electrically welded seams and shall be installed in accordance with the regulations of the National Electrical Code. Compression couplings and box connectors used in the installation of Electrunite Steeltubes shall be Underwriters' approved type and so listed.



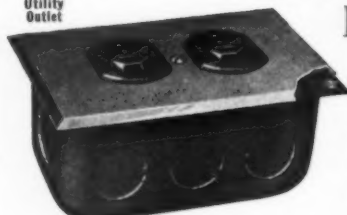
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Let us send you a sample of it. You really have to see this flexible Micabond—and feel it—to fully appreciate its remarkable flexibility—and its lack of tackiness. A post-card will bring a sample. Write today!

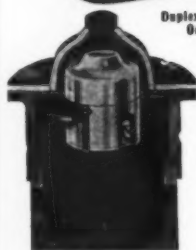
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Single
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Watertight Floor Outlet

Build up prestige and good will by installing quality materials in all your jobs.

STEEL CITY PRODUCTS

help the electrical contractor gain a reputation, not only for furnishing quality products but workmanship as well, because they are manufactured in accordance with the workman's needs, insuring speedy, dependable performance at all times.

We manufacture a complete line of outlet boxes, covers, switch boxes, conduit fittings and electrical specialties, furnished in sherardized, galvanized, enameled or cadmium finish.

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cable is wound upon a keeper spool that is keyed to the ratcheted hand-wheel shaft. A special steel growler base rides on the flanges of two angle-iron uprights which act as guide rails. Diagonal floor braces are provided in a fixed position to prevent the outfit from tipping forward. Due to the forward overhang of the heavy growler laminations, no back braces are needed.

Mono-Rail Increases Crowded Small Shop Efficiency

A $\frac{1}{2}$ -ton mono-rail system in the Francis Pautz motor shop at Elmira, N. Y., permits the use of a small room for important motor repair



equipment without requiring wide floor-dolly aisles. This system as viewed in the upper foreground extends to the front door for hoisting apparatus from delivery trucks. Frogs are provided to swing the traveling chain hoist to the right to a winding or repair bench. Another track leads off to the right over the lathe, while the main run ends over a lift-top bake oven in the extreme background, behind the coil-taping and insulation cutting bench that occupies the center of this shop.

Type C Lamps for Small Oven Heaters

Four 200-watt lamps are used as heating elements in a 9 cu.ft. bake oven that is used for small overnight bake jobs by the Electric Motor Sales and Service Company, Albany, N. Y. Stators of $7\frac{1}{2}$ hp. and smaller motors are placed in this oven with four lamps turned on for an hour. Two lamps are then turned off, and 400 watts left on overnight with what is claimed to be satisfactory baking results. The lamp sockets are at the bottom of the oven beneath a

Just the Line for Range Campaigns

Trumbull Type "H" and "S" FUSE-PULLER SWITCHES

A complete line of easily wired, low cost, Dead Front Fuse - Puller Switches, with or without branch circuit cutouts (2-8). Approved for Main and Load side service.



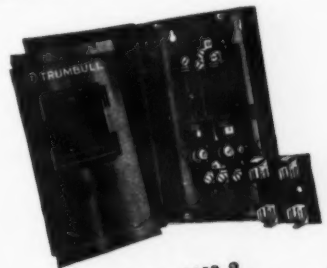
No. 2907-2
Type "H" — Shield removed



No. 2903-4
Type "S"



No. 2963-4
Type "S"



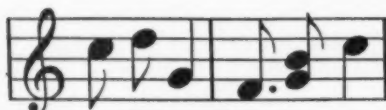
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THE TRUMBULL ELECTRIC MFG. CO.

PLAINVILLE

SEND FOR BULLETIN No. 120





THE CURRENT GOES ROUND AND ROUND



●The torque of the series wound A. C. motors found in food and drink mixers is in a large measure dependent upon the specific resistance of the brush material. The lower this resistance, the greater the torque.

●But low specific resistance tends to reduce the contact resistance (measured as a voltage drop) which is so necessary for good commutation. A good carbon brush for food mixer motors has just the right combination of these two resistances.

●Good commutation is particularly essential in preventing overheating. Since an excessive temperature rise acts as a drag on torque, obviously any old piece of carbon won't do.

USE OHIO PRE-TESTED MOTOR BRUSHES EXCLUSIVELY

THE OHIO CARBON COMPANY

12508 Berea Road Cleveland, Ohio

sheet steel drip shield, and are on separate switches to permit any desired number being operated.

Sidewalk Motor Handling Simplified

Motor pick-ups and deliveries in congested business sections are made easier with end-gate planking that is provided by the Furst Electric Company, Long Island City, N. Y.



Two 8-ft. planks are joined with cleats to provide a 20-in. wide, one-piece slide for skidding motors in or out of a light delivery truck. This outfit is carried in the truck at all times because it is so useful for sidewalk motor handling and also at standard shipping docks that are higher than the bottom of the truck bed.

Tool Tray and Lamp Stand

Adjustable floor lamps were made up for the winders with integral trays for holding their small tools, in the shop of Berger Bros. Electric Motors, Inc., Rochester, N. Y. In



winding stators, the workman has good local lighting at the desired location, and his tools are always at his side. These lamps were made up in the shop out of telescoping pipes and wing-nut fittings. An old motor end bell provides a heavy non-tipping base for these outfits.

SHAWMUT SHUR-LAG RENEWABLE FUSES



- ★ Links are of uniform thickness . . . can be inserted from either end of fuse case.
- ★ Shawmut Shur-Lag Renewable Fuses are sturdily built and provide greater time lag under unusual overload conditions.
- ★ Ferrule Type permit speedy renewal . . . plenty of room to insert link in fuse case . . . Ferrules have deep screw driver slots.
- ★ After blowing, fragments of link can be quickly, easily removed.
- ★ Knife Blade Type have no small parts to become lost or mislaid in refilling . . . simple and efficient in design.
- ★ Permanent rigid blade alignment . . . Blades are assembled to an extra heavy insulating crossbar.
- ★ Can be assembled ONLY one way . . . the correct way.

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THE CHASE-SHAWMUT CO.
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Fuse Specialists Since 1893



You
FURNISH THE JOB
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HAVE THE MOTOR TO DO IT!

● Difficult or exacting drive problems to face? Motors to meet unusual torque or starting conditions? Planning power for new equipment still in the paper stage?

Then call the man from Fairbanks-Morse!

For he is not limited in his specifications to a few motors, one of which he must choose to do a given job. In his complete line, he has both a wide range of types, and many graduated sizes and ratings within each group. In any motor he specifies, you are

assured of extra performance and extra values beyond the formal specifications—for his motors have such features as sealed-in ball bearings. Measured grease tube lubrication. Dynamically balanced rotors. Sealed-in leads. Advanced core construction, insulation, and group-wound coils.

For full information, address Dept. F-421, Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill. 34 branches at your service throughout the United States.

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YEARS OF
PRECISION
MANUFACTURING

FAIRBANKS - MORSE

Motors



POWER, PUMPING AND WEIGHING EQUIPMENT

Code Chats

Questions and answers relating to the interpretation of the National Electrical Code . . .

Conducted by F. N. M. Squires

Chief Inspector New York Board of Fire Underwriters

Raintight

How are joints made raintight as called for in 404-b?

Rigid conduit can be made raintight by proper threading and coupling and then by the use of white or red lead or other suitable caulking.

Electric metallic tubing can be made raintight by the use of watertight couplings or connectors which are now obtainable on the market.

Ground Electrolysis

A few years ago I installed a 3-wire 60-amp. meter entrance at a residence which was already wired knob and tube, grounding the entrance using a driven 1½-in. galvanized pipe 9 ft. long.

Last summer this pipe had to be removed and when my customer installed an electric water pump for his driven well I then grounded his meter entrance and electric range to his water pipes.

This winter along come some plumbers installing a hot water furnace system and they tell my customer that these grounds will in time eat out his water tanks and pipes, quoting different instances in a nearby city. My customer asked me to change the grounds back like they were but I told him to wait till I got some more dope on the subject."

Grounding the neutral wire of an a.c. supply system to a water pipe does not generally cause any deterioration of the water pipe.

Trouble has been experienced, however, where direct current has found its way on to water pipes and then passes off to earth. This has been noted in areas adjacent to d.c. trolley car lines or d.c. transmission lines and is practically always due to a leakage of the direct current. In the instance mentioned by our inquirer it is by far preferable to use the well pipe as a ground, even

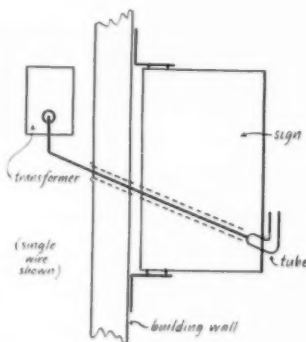
though it is a driven well, than to use a mere driven pipe.

A driven pipe or rod, unless in damp soil, is not a very dependable grounding method.

High Voltage Sign Wires

If open wires are run from a building to a neon sign this rule 3809d states they shall be separated 2 in. between conductors and between the conductors and other objects.

Would they be allowed to extend from a building in porcelain tubes to the sign as shown below?



Yes, the wires could extend from a building in porcelain tubes provided the tubes and the wires are not subject to mechanical injury, and the tubes are of a grade of porcelain approved for the voltage encountered.

Such construction should not be used for a swinging sign.

Ungrounded Lighting Circuits

Is there any Code ruling against using an ungrounded delta-connected 3-phase 110-volt transformer bank to supply lighting circuits in an isolated plant? The transformers in question supply the lighting circuits and a 3-phase 110-volt crane

motor. Although having less than 150 volts to ground, the system is not grounded in anyway.

Section 903 of the Code requires, in general, that a.c. systems be grounded, but rule 2001-b permits a deviation from this and allows unidentified ungrounded systems and circuits where special permission for their use has been obtained from the inspection authority having jurisdiction.

Such circuits would have to have each wire fused and the inspection department would probably require that single pole switches be not used.

Grounding

Why does the Code permit in Section 908b a No. 6 wire to be used as a system ground conductor for a 3-wire, 110-220 volt, 250 amp., single phase service using 250,000 C.M. wires?

The above wires will have to be in 2½ in. conduit. This service conduit must have a No. 2 grounding conductor as required by Section 908l. Why the difference in the two grounding conductor sizes?

We are indebted to H. S. Warren, chairman of the Committee on Article 9 of the Electrical Committee, N.F.P.A. for an answer to this problem as follows:

"This is in reply to a question relating to Section 908, paragraphs b and l.

"In case of a high-voltage fault, the excessive current on any circuit grounding conductor exists only for the relatively short time required to deenergize the high-voltage circuit.

"For a low-voltage fault which does not involve the ground, the circuit grounding conductor will carry only a very small current.

"For a low-voltage fault which involves the neutral conductor of the circuit, the fault current will divide between several paths, the number depending upon the number of grounds on that particular circuit. In general the major part of the fault current will go over the neutral conductor directly back to the transformer.

"On the other hand, if a low-voltage fault occurs between a live conductor and the conduit, the grounding conductor connected to such conduit must carry the full fault current. Another factor to be taken into account is that a fault current in the service conduit cannot be considered as being limited or protected by fuses.

"As to the specific sizes of ground-



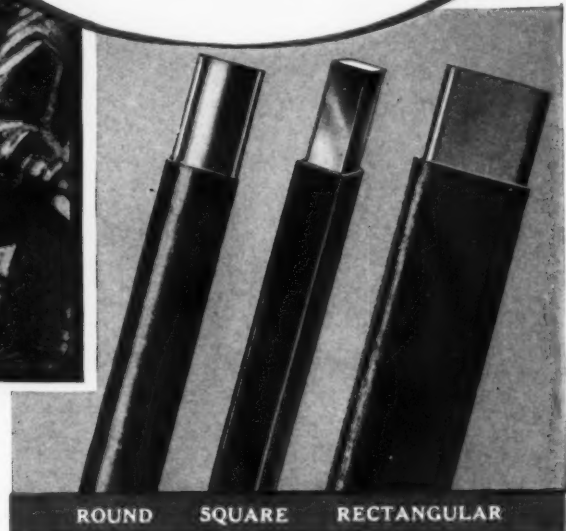
**A COIL OF WIRE
MAY CREATE
NEW CUSTOMERS!**

**Wind Motors with Deltabeston
Magnet Wire with
PURIFIED Asbestos Insulation**

Every first-rate motor repair job you do helps to increase your business in two ways. First, your satisfied industrial and commercial customers will give you more work. Second, they'll recommend you to other firms so that you gain new customers.

Wind motors with Deltabeston Magnet Wire and you're certain to make a superior installation. Deltabeston's new *Purified Asbestos Insulation* has far greater dielectric strength, and is more resistant to heat, moisture and acids, than any other magnet wire insulation. *Purified Asbestos* is exclusive to Deltabeston.

In addition, the insulation is tougher, yet more flexible. It won't crack when the wire is bent at sharp angles.



Send the coupon now for samples and complete information.

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Section Y-683
General Electric Co., Bridgeport, Conn.

Please send me samples of the improved Deltabeston Magnet Wire and your new Deltabeston Catalog describing the *Purified Asbestos* treatment.

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GENERAL  ELECTRIC

DELTABESTON WIRE AND CABLE

APPLIANCE AND MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONN.



REVOLUTIONARY !

THE Super Air Screw has revolutionized the "fan" industry. It has introduced a new standard of performance. It employs the scientific principles of aerodynamics developed in the field of aviation—creating an air-circulator which, instead of merely throwing a short-range blast of air, actually *air conditions* an entire room. Its air circulating power is amazing.

One Super Air Screw can do the work of four to six ordinary fans. A demonstration is all it takes to prove it . . . to convince any prospect and clinch the sale.

As for beauty . . . the modern, streamline design of the Super Air Screw makes it unquestionably the most handsome and impressive air circulator on the market today.

There are ready sales and quick profits in Super Air Screws. Write now for our proposition and franchise particulars.

Sizes: 18" to 30" blades—all currents—all speeds.

SUPER *Air* SCREWS

Super Air Screw Division

MARATHON ELECTRIC MFG. CORP. - WAUSAU, WISCONSIN

ing conductors specified in 908-b and 908-l, these perhaps cannot be given rigorous quantitative justification but they have been employed with apparently satisfactory results for quite a good many years and in any event it is evident from the above that the grounding conductor for service conduit should, in general, be larger than that for grounding the circuit."

We thank Mr. Warren for his explanation of the above matter and also wish to call the attention of the electrical industry to the grounding situation. The grounding rules have progressed from Code to Code but are they sufficient for our present day network development?

Undoubtedly the grounding requirements were built up to take care of fault currents from a single transformer or bank of transformers feeding a single secondary supply line. But are the grounding connections sufficient to handle fault currents from a network where the current is being fed into the network from a multiplicity of transformers? It is quite evident that it is now high time that our grounding connections and fittings be built up to adequately care for the heavy fault currents which may be expected.

Varied Use of Armored Cable

On page 26 of January 1936 *ELECTRICAL CONTRACTING* we see that a piece of armored cable was skinned back and installed in part in $\frac{1}{2}$ in. conduit, we are wondering if this complies with the Code.

In another article in another copy of last year's *CONTRACTING* we read that a contractor pulled in short piece of armored cable in $\frac{1}{2}$ in. conduit for protection of same on building wall. Is this permissible according to the Code?

In the first question where the armored cable has been skinned back so that the wires will extend for the entire length of the conduit without necessitating splicing, there should be no objection to the procedure outlined as the wires are the same as used for conduit work.

It would be entirely wrong, however, to reverse the procedure and to couple up a length of armored cable armor with conduit by means of a connector and then pull the conduit wire straight on through both the conduit and the armor.

While the armor of armored cable may have the general appearance of

ANNOUNCING . . .

Sensational Improvements In Display Window Lighting



New
Sterling
LITE-FLO
Stipple

AND **NEW**
Sterling
FRONT-LINE
LIGHTING

NEW Sterling *Front-Line Lighting*, made possible by New Sterling Lite-Flo Reflectors, is revolutionizing show window illumination. The improved design of these new Reflectors, which includes the New Sterling Lite-Flo Stipple, conserves light heretofore wasted on non-productive areas and concentrates it on the lower front of the window—the FRONT-LINE of Sales Appeal.

Every merchant and display man knows that the lower front of the window is the vital section—first to meet and catch the eye. Front-Line Lighting increases interest and attention-attracting power by intense illumination at this vital point.

Using the same lamps—the same operating cost—Sterling Lite-Flo Reflectors afford lighting improvement so drastic that every merchant should have them.

Equip yourself to capture both old and new show window lighting jobs. Write today for complete information about this key to new business. Mail the coupon.

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1435 W. Austin Ave., Chicago.

Gentlemen:
Please send full information about Sterling Front-Line
Lighting and prices covering your new Lite-Flo Reflectors.

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ARMORED CABLE
APPLIANCE CORDS
BUILDING WIRE—All
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LEAD-COVERED WIRES &
CABLES
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And all kinds of special cables
to meet A.S.T.M., A.R.A.,
I.P.C.E.A., and all railroad, gov-
ernment, and utility companies'
specifications.

CRESCENT
Insulated Wire & Cable Co., Inc.
Trenton, N. J.

flexible conduit, yet it is not the same.

In reference to the second question, there is no objection to slipping a piece of conduit over armored cable for the purpose of protection provided sufficient protection against mechanical injury is afforded by the conduit.

Transformers with Non-Flammable Liquid

Does the following from 1102a pertain to any size transformer:

"By special permission transformers containing an approved liquid that will not burn, may be located inside buildings, with no enclosing compartment or pan, etc."

Rule b mentions a certain size, but this seems to be a different rule as it mentions concrete curbs.

This refers to low voltage transformers only; that is, to those with a primary voltage not over 600 volts.

Such transformers (filled with approved non-flammable liquid) of 25-kva or less, do not require metal pan nor concrete basin. Those over 25-kva do not require the pan or basin provided a means for absorbing generated gases is provided or a properly connected pressure relief vent is provided.



ONE-MAN REINSPECTION PROGRAM:
About eighteen to twenty reinspections are made each week in Waterbury, Conn., by Martin C. O'Rourke, who has served as electrical inspector of that city, for the past six years. Rewiring jobs of considerable size have resulted from this activity. A recent reinspection of a commercial building required twenty-eight hours inspection time, and \$4,500 rewiring work, while another office and store group necessitate a \$1,600 clean-up job. A similar reinspection of the city's thirty-nine public schools revealed the need for a \$21,000 appropriation for repairing and modernizing the wiring in twenty-two schools. Mr. O'Rourke also spends part of his time weeding out hazardous electrical appliances that are offered for sale, such as unapproved instantaneous electrical faucet heaters, electrical moth fumigating elements for clothes, closets, and other "gadgets."

KILLARK EXPLOSION PROOF CONDUIT FITTINGS

for use in hazardous locations where explosive vapors are found. Eliminate dangers from explosions caused by short-circuits and arcing switches.



WRITE FOR BULLETIN

Every needed size and type of explosion proof fitting.

Made of unbreakable malleable iron . . . cadmium plated.

Manufactured by

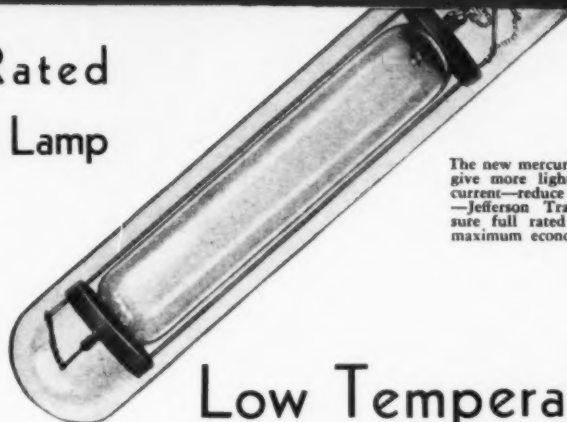
KILLARK ELEC. MFG. CO.
3940 EASTON AVENUE ST. LOUIS, MO

Entrance fittings Explosion proof fittings
Conduit bodies Bell transformers
Vaporproof light fittings Fuse panels

JEFFERSON TRANSFORMERS FOR MERCURY VAPOR LAMPS

Insure Full Rated
Capacity to Each Lamp

The new mercury vapor lamps
give more light per unit of
current—reduce electric bills
—Jefferson Transformers in-
sure full rated capacity and
maximum economy.



Low Temperature Rise on Continuous Operation



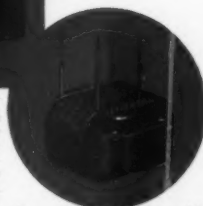
Wall Mounted Type in
neat metal case for
mounting on wall or
post. Bottom is open
for ready access to wir-
ing compartment. Snap-
on connections make it
easy to match primary
supply line voltage. Cat. Nos. 232-
401, 232-411, 232-421,
232-431.



Fixture or Suspension
Type for mounting be-
tween ceiling and
lamp—with stand-
ard threaded cou-
pling at each end.
Cat. Nos. 232-
501, 232-511,
232-521, 232-531.



Weather-proof
Type in one-piece
drawn steel case
—interior com-
pounded. Con-
nections at bot-
tom. Cat. Nos.
232-601, 232-
611, 232-621,
232-631.



Core and Coil Type—which fits in
fixture. Vacuumized, impregnated
with final double varnish dip,
baked. Cat. Nos. 232-301, 232-
311, 232-321, 232-331.

Generously designed Jefferson Transformers give full rated capacity to mercury vapor lamps. They operate continuously with low temperature rise—which again means high efficiency and long life.

During the initial starting period when mercury is gasifying, meter readings show an extremely low current demand, which is another power bill saving, particularly where there are many lamps.

Jefferson's long specialized experience in the development of transformers for mercury vapor and Neon luminous tubes, sun lamps, street lights and the like, makes possible the high quality special types of transformers and reactors required to insure the greatest lighting efficiency.

Every Jefferson Transformer—every detail of design and manufacture—give evidence of the skill of the expert.

They are made in types to suit all applications—including high power factor transformers which further reduce electrical energy demand and line losses.—Bulletin 351-MV mailed on request. JEFFERSON ELECTRIC COMPANY, Bellwood (Suburb of Chicago) Illinois. Canadian Factory: 535 College Street, Toronto.

JEFFERSON

Mercury Vapor Lamp Transformers

ELECTRICAL CONTRACTING

S. B. WILLIAMS, Editor

TVA Decision

WHEN first announced the Supreme Court's TVA decision seemed to rob the electric light and power industry of all incentive to go ahead. The industry generally was stunned, perhaps because it had so absolutely expected an entirely different finding by the court.

With the first days of disappointment past, and also with a clearer understanding and appreciation of the meaning of the decision, it begins to appear that private utilities have if anything a greater incentive to develop than they had before.

With the TVA decision interpreted in its favor the government can be expected to go forward with plans for cheap power development elsewhere. There is, therefore, the obvious challenge to the power industry to lower rates and so extend electric service that further government developments in this direction be unnecessary.

Undoubtedly the power industry will find the way to promote usage and to extend service far beyond the present. For that reason the electrical construction industry need not feel that the decision will dry up utility load development and expansion initiative. If anything, it will be sharpened.

Adequate Wiring Promotion

INTEREST in the promotion of adequate wiring is rapidly growing. The National Electrical Manufacturers Association has a preliminary planning committee on the subject which is expected to make a report early in March. The Connecticut inspectors are interested in a program similar to that under way in North Carolina. Denver has started a promotional program. Some of the Red Seal cities are again pushing

that activity. A number of electrical leagues are planning to engage in some kind of wiring program. Public utility executives at recent meetings have discussed adequate wiring as an essential program to the development of residential load. One company is considering wiring one or more apartment buildings as a case study to determine the effect of adequate wiring on energy consumption.

In other words, the industry is ready for a program. Adequate wiring is recognized as essential. Now is the time to launch a planned national activity to promote adequate wiring.

In the course of our work to arouse the interest of the industry in this subject, many suggestions have been made but without exception letters that we have received from utility executives, manufacturers, inspectors, league managers and contractors have all expressed the greatest interest. So keen has this interest been that the letters have some of them run to four and five pages.

The question in everybody's mind is how can adequate wiring be promoted and sold? The local industry is looking for ideas. The time is opportune and the industry will be receptive to suggestions and plans.



Contractor Turnover

RAPID turnover in the ranks of small contractors is given by a contractor, who for many years has been prominently identified with national and local association work, as one of the major evils that is holding our industry back. It is true that there has been a considerable increase in the number of small contractors recently. That has been due in large measure to the increase in small construction and the desire on the part of unemployed mechanics to get work. That the turnover is great is no surprise because the builders beat them down as far as they can with the result that the poor fellows do a lot of work and get little.

There is no way possible of meeting this condition without the cooperation and assistance of the wholesalers. Licenses offer no real deterrent, and it is almost impossible to reach these men with education.

So long as unemployment exists we are bound to get this rapid turn-over of small contractors. When business gets better we can expect a fall-

ing off of the number who branch out for themselves. The experiences of many who tried and failed will undoubtedly act as a brake.

In the meantime it might be well for local associations again to look into the possibilities of securing cooperation from the wholesalers along the line of credit control. It is true that these small fellows can get material from other sources, but they will have to pay cash.

Journeyman License

THE question of licensing journeymen seems again to be coming to the front in proposed legislation. Those who urge it see licensing as a means whereby poor workmanship can be reduced. Is this a sufficient reason?

Journeymen have no responsibility to the public. They work for contractors who alone can have that responsibility. If a mechanic does poor work he must answer to his employer.

The inspector stands between the public and the contractor. If the work is not right the contractor must see that it is corrected. For that reason there can be no justification on the grounds of public safety for licensing journeymen.

On the other hand there are many reasons why journeymen should not be licensed. In the first place a license to a mechanic creates an opportunity for unfair competition for licensed contractors. The public does not know the difference between a master's and a mechanic's license and naturally assumes that anyone with a license is qualified to do the work.

Licensing would place the control of the labor situation in the hands of outsiders and in the case of labor troubles would work a hardship on both workers and employers. In San Antonio it was declared unconstitutional because it would deprive men of a right to earn a livelihood during a strike.

There are many instances of a temporary labor shortage. Licensing would keep out labor from other places, thereby shooting up the local costs for overtime.

There never has been any real justifiable reason for licensing workmen. Organized labor naturally wants it, but that in itself should be a deterrent because of the possibility it presents for using the act to organize a community. It is obvious that the labor member of any examining board would be a union member. Unorganized workers would have no voice.

Wiring Costs

IF the price of automobiles is reduced, more people buy cars. If electric refrigerators are reduced in price, more people will buy them. These are the facts from which it is argued that if we reduced the price of wiring, people would buy more wiring.

To debate against this argument is almost futile, because those who advance it rely entirely upon its very obviousness. For that reason studies must be made to see whether this obvious economic fact stands up under the test of practice.

Do builders ask for bids on the amount of wiring that a contractor will supply for so many dollars? That in effect is the competition in the automobile market—the most car for the money. Will builders pass on to the customer the advantages of a lower priced wiring system in a more extensive installation, or will they simply pocket the difference?

We now have a great many different wiring methods. In most communities one method prevails. Are the houses in the cities with higher cost methods more poorly wired than when the wiring method costs less? That might be an interesting investigation to follow up.

In the past ten years a number of new lower cost wiring methods have been introduced. They have made a place for themselves but have they *per se* increased the amount of wiring per home?

In other words, let us look at this matter from the standpoint of facts and not based upon the experience with a ready made object like an automobile. It was more expensive piping and plumbing fixtures that made people conscious of the desire for more plumbing—not cheaper. And so it has been with other home commodities.

Lower cost wiring methods will come, and if satisfactory will make a place for themselves. Undoubtedly the trend should be towards giving more and more to the consumer for his dollar. Wiring should be made cheaper if it can be done so by giving the customer more, not less, for his money.

We sometimes wonder, however, how many automobiles would have found their way onto the streets in spite of price, if they had not been energetically sold? We sometimes wonder if perhaps some of this same brand of selling energy applied to house wiring might not greatly increase the average order and possibly in that way bring about lower prices.

N.E.C.A. News..

Material for this department is supplied
by the headquarters staff of the

National Electrical Contractors Association

420 Lexington Avenue, New York, N. Y.

President	Vice President	General Manager
E. N. Peak	Louis Kalischer	Laurence W. Davis
1603 West Main St.	17 Bergen St.	420 Lexington Avenue
Marshalltown, Ia.	Brooklyn, N. Y.	New York, N. Y.

N.E.C.A. Cooperating in Rural Electrification Program

The National Electrical Contractors Association has been called upon by the Rural Electrification Administration to cooperate in the development of specifications for farm wiring installations and in submitting of recommendations as to contractor qualifications for handling this type of work.

Because of its knowledge of the qualifications and experience of electrical contractors equipped for building rural lines, the N.E.C.A. has also been called upon to furnish lists of such contractors to be invited to bid on rural line projects in their localities.

March Meeting of Executive Committee Has Important Program

At the three-day meeting of the N.E.C.A. Executive Committee which is to be held at the Hotel LaSalle, Chicago, on March 24 to 26, important reports will be submitted from the various national committees. Recommendations regarding a uniform state licensing bill are expected to be submitted by the Committee on Legislation. The Constitution and By-Laws Committee will submit recommendations for revisions of the by-laws of the N.E.C.A. to be recommended for action at the next convention. The review now being made by the Cost Data Committee for estimating data included in the Electricists' Estimating Manual is planned to present this important data in a more useable and ready-reference form. Definite progress has been made by the Distribution Committee in working out the principles of economic distribution between manufacturers, wholesalers and contractors. The Highway Crossings Signals Committee is receiving fine support in many of the states in contacting State Highway Commissions on this important program. The preview of the new National Electrical Code in the revised form prepared during the past year by a special committee of the Electrical Committee, N.E.P.A., headed by Dr. Lloyd of the

Bureau of Standards, will be analyzed by the Executive Committee and their recommendations submitted to the N.E.C.A. members of the Electrical Committee as a guide to action at the April meeting of the Electrical Committee. These and many other equally important problems will provide a full agenda for this three-day meeting. Announcement of the time and place for the 1936 annual convention is expected to be made by the Executive Committee at this meeting.

Industry Meetings Planned for Peak's Western Trip

Announcements received from the twenty-four cities included in the itinerary of President Peak's western trip between April 4 and May 21 show plans under way for enthusiastic meetings at all places. Several requests have been received from additional cities to be included in the itinerary but because of the necessity for maintaining the announced schedule for this seven-week trip it will not be possible to accept such invitations except where they may be included within the scheduled time of his visit to a neighboring city.



DOING BIG NEWSPAPER CHANGE-OVER: March First marked the twenty-fifth year in business for George E. Davis, (left) of the Davis Electric Co., Newark, N. J. His son, Arthur L. Davis, has been active in the business since completing four years "with the tools" following graduation from college. They have a large local job now under way which consists of the installation of a 1000-k.w. steam turbine generator and an automatic switchboard in a local newspaper plant. Extensive feeder and switchboard changes are being made to parallel this unit with two 500-k.w. generators. This involves a 5-ton assembly of specially designed busway. A new 200 h.p. press motor and automatic control equipment are also being installed, all work being done without interrupting plant operations.

In most of the cities on this trip the arrangements include special group meetings for electrical contractors exclusively during the day and with general industry evening meeting at which all groups of the industry will be invited as guests of the electrical contractors for discussion of plans for industry promotion as applied to their local problems.

In a number of cities local industry promotion committees have already been established similar in character and scope to the national Electrical Industry Promotion Committee and it is expected that Mr. Peak's visits to all of these cities will still further stimulate the activities and influence of this industry organization movement.

Dominion-Wide Organization Program Planned in Canada

Under the direction of George W. Patterson of Toronto, representing the Eastern Canadian Division on the N.E.C.A. Executive Committee, a campaign has been initiated to build up Canadian membership and chapters in all of the provinces. A series of organization letters has been sent by Mr. Patterson to approximately 3500 electrical contractors throughout the Dominion of Canada and the response to these has indicated a wide-spread interest in this movement.

Many Requests for New Simplified Business Record System

Twenty thousand copies of a ten-page folder illustrating and describing the operation of the new N.E.C.A. Simplified Business Record System have been sent out to members of the industry during the past month. The response from the electrical contractors with requests for this Business Record System to replace their present accounting methods has been far ahead of expectations and hundreds of requests have come in from non-members of the Association for information on Association membership which is required to obtain this system. This new N.E.C.A. Simplified Business Record System is not sold but the original system is furnished free to all members of the N.E.C.A. and to applicants accepted for membership.

Enthusiastic endorsement of the System has been received from users who have already put it into operation. One contractor reported having transferred all of his records from January 1 to

AN ANNOUNCEMENT OF INTEREST TO THE ELECTRICAL INDUSTRY

A DECISION OF THE UNITED STATES DISTRICT COURT

for the
Eastern District of New York
Rendered February 13, 1936

DECLARED VALID PATENT 1,635,829

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Hawthorn Cable & Wire Corporation
National Electric Products Corporation
The Okonite Company

Paranite Wire & Cable Company
Providence Insulated Wire Company
John A. Roehling's Sons Company
Simplex Wire & Cable Company
Triangle Conduit & Cable Company, Inc.
United States Rubber Products, Inc.

Note: Unauthorized manufacture or sale or use of a patented product constitutes infringement of the patent

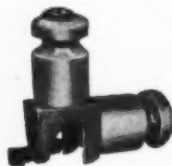
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WIRING SPECIALTIES

WHEN YOU THINK OF THE COST . . .

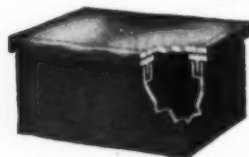


Cut-away view of No. 110 Box showing how the tapered unit receptacle fits tapered opening in top of box body.



Two No. 5 1/2 Solid Insulators attached to No. 400 Insulator Support with 2"x1/4" No. 20 Machine Screws.

When you think of the cost of floor boxes or wiring specialties, don't forget installation time. Fullman products can be installed in a few minutes — no fussing with small screws or complicated parts. And they cost no more. Here's real economy! Your wholesaler will give you a catalog and show samples.



FLOOR JUNCTION BOXES
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FLOOR BOXES

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SUPERIOR TIME-LAG RENEWABLE FUSES

Insure

Continuous Positive Fuse Protection



Eliminates possibility of inserting "foreign" links in fuse cases and the dangerous practice of "doubling up" links. Proper protection assured always through use of ONLY the correct powder-packed element.

What it gives users

- Reduction in shutdowns and needless delays in production
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- No deterioration or loss of stable characteristics even after repeated momentary overloads
- Savings in current

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Only 2 PARTS and the element

The element is "powder-packed" — this prevents destruction of casing when fuse blows. Copper-to-copper contacts mean high conductivity and low resistance. The arc-choking powder supports the fusible link so there is no sagging and stretching.

TRICO FUSE MFG. CO.
MILWAUKEE, WISCONSIN
Dept. L

the new system and found that it met every requirement of his business. He stated that the system is being operated easily by the girl in his office who has had no special training as an accountant and that his first month's records were taken off perfectly by the trial balance and monthly summaries provided with the system. "I feel," he said, "that this is as far ahead of my former accounting methods as the new Ford V-8 is ahead of the old Model T."

Appointments to Committee on Legislation

Chairman Robt. W. McChesney has announced the following additional appointments to his Committee on Legislation, located in most cases in the capitols of their respective states:

A. H. Rosenberg, Phoenix, Ariz.
A. E. Dickey, Twin Falls, Idaho.
G. M. Sanborn, Indianapolis, Ind.
Victor Thomas, Des Moines, Ia.
S. O. Wilkinson, Boston, Mass.
B. C. Fowler, Lansing, Mich.
E. G. May, Albany, N. Y.
A. J. Musser, Harrisburg, Pa.
A. E. Sherwin, Burlington, Vt.
T. W. Wilmer, Richmond, Va.
A. M. Rosenblatt, Charleston, W. Va.

President Peak Member of Industry Steering Committee

In accordance with recommendations of the Electrical Industry Promotion Committee adopted at their last meeting, an interim steering committee has been established to carry on the program between the meetings of the main committee. President E. N. Peak has been designated as the member of this steering committee to represent the N.E.C.A. The other members of the committee are C. E. Swartzbaugh representing N.E.M.A., B. W. Clark representing N.E.W.A., and C. E. Greenwood representing E.E.I.

N.E.C.A. Officers Attend Regional Meetings

During the month of February both President Peak and General Manager Davis attended a number of regional meetings of electrical contractors, which were well attended.

On February 3 and 4 Mr. Peak addressed the convention of the Wisconsin Electrical Association held at Madison, at which 25 members were in attendance. On February 7 and 8 he addressed two meetings in Minneapolis which in spite of 40 below zero weather and a terrific blizzard were both well attended. The first of these meetings was for electrical contractors only, at which Mr. Peak presented the many activities which the N.E.C.A. is carrying on in the interest of electrical contractors. The following day he addressed a convention sponsored by the North Central Electrical Association and the Municipal Utilities Association

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THIN MODEL *Levolver*

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No. 41
6 Amp.

At the left are shown six logical uses for this practical Levolver, which may be secured in three different stem lengths. You'll make no mistake in ordering these Levolver Thin Model Switches.



Levolver
Push Buttons
Bracket Switches
Control Panel Switches
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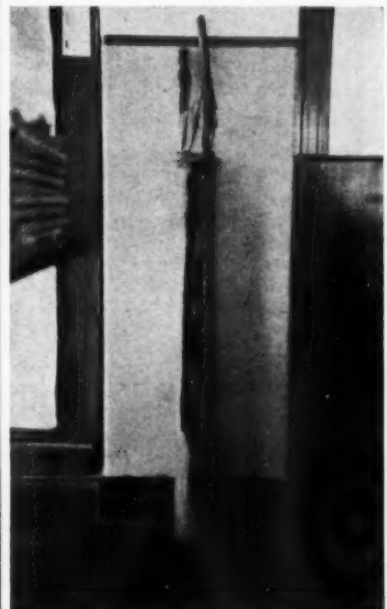
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Box No. 670

Levolver
Wire Lamp Guards
Protective Lamp Guards
Wall Guards
Control Panel Guards
Long Changers

at which there was an attendance of about 250. Mr. Peak's presentation of the Rural Electrification Program created such interest that following his talk many of the men present remained for nearly two hours to get further first-hand information on the rural electrification plans.

On February 21-22 President Peak made two addresses before the eighth annual convention of the Minnesota Electrical Contractors Association at St. Cloud, which was well attended by electrical contractors from all parts of the state. His first talk at the Friday afternoon session covered the National Association activities and their relation to local and state problems, and on Saturday morning he presented the rural electrification developments of the R.E.A. and E.H.F.A.


One hundred and twenty-five electrical contractors and inspectors turned out for the meeting on February 3 of the Master Electricians Association of Boston at which General Manager Davis was guest speaker.



INSULATION FAILURE AT BUSHINGS: Vibration from heavy rotating machinery was reported to have caused the conductor insulation to become chafed until one of four 600,000 c.m. a.c. feeders become grounded to a 4-in. steel conduit bushing, causing a 42-in. long slot to be arced through the conduit. This breakdown occurred at a distribution center located about 250 ft. from the meter board fuses. Although these fuses were said to have been of proper size they did not function because of the length of this feeder, until the heavy strands of copper became sufficiently welded together in the conduit to provide a low resistance short circuit. This breakdown occurred in an industrial loft building in Brooklyn, N. Y., and required an expensive repair job while the plant was shut down. Because the electrical inspection department recommends the use of bushings made of insulated material for feeder runs, this sample was brought in from the job and is kept on display in the office.

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Contracting

News

TVA Decision Limited in Scope

After two months of deliberation the United States Supreme Court on February 17 handed down a decision in the TVA case which, while specifically confined to a single contract relating to the purchase of transmission lines emanating from Wilson Dam, inferentially upheld all power activities so far undertaken by the Authority.

The eight-to-one opinion, with Justice McReynolds the sole dissenter, made three specific findings:

1. Construction of Wilson Dam by the Federal Government was justified under its war powers and its power to aid navigation.

2. Power generated at a dam legally constructed by the Federal Government is federal property and may be disposed of by Congress.

3. Government-owned transmission lines extending to a fair market for such power are constitutional.

The suit was brought in equity by certain minority stockholders of the Alabama Power Company to contest a contract between the company and TVA. This provided for the sale of company-owned transmission lines emanating from Wilson Dam to TVA; the transfer of certain real property near the Wheeler Dam to TVA; a power interchange agreement between the company and TVA, together with the sale of surplus power from the Wilson power plant; mutual restrictions in areas served by the two parties; and cooperation in the promotion of appliance sales. The Court limited the points at issue to the transfer of transmission lines.

Transmission lines provide a means for reaching a market for surplus power. The alternative would be sale of the power to the Alabama Power Company or its affiliates. The Court could find no constitutional grounds for denying the government the right to seek a wider market.

The Court specifically limited its decision to the case as defined, without ruling on the constitutionality of governmental acquisition or operation of local or urban distribution systems. It made no ruling on "government in business," either in the Tennessee Valley or outside, holding the question to be irrelevant. "The Government is not using the water power at Wilson

Dam to establish any industry, or business. It is not using the water power at the dam to manufacture commodities of any sort for the public. The Government is disposing of the energy itself."

Industry Promotion Committee Plans

At the last meeting of the new Electrical Industry Promotion Committee, composed of three members from each of the four national associations, there were crystallized plans for coordinating and forwarding six commercial programs now active. These are Better Light-Better Sight, Kitchen Modernization, Electrical Housewares, Electric Water Systems, Electric Welding and Highway Lighting. The subjects of house wiring, air conditioning, unified financing plans, and industrial and commercial lighting will be taken up at the March meeting in Chicago.

Earl N. Peak, president, N.E.C.A., and initiator of the activity, is permanent chairman, and C. E. Greenwood, commercial director, E. E. I., is secretary.

Minnesota Contractors Hold Harvest Convention

In the belief that 1936 will be a harvest year, the annual convention of the Minnesota Electrical Association and the Minnesota Electrical Council held at St. Cloud on February 21 and 22, was planned to sow the seed of business opportunities that will make the year one of greatly improved business.

An entire session was given over to rural electrification with E. N. Peak, president, N.E.C.A.; Frank T. Langford; C. P. Wagner, manager, Farm Service Department, Northern States Power Company; R. B. Pulver, rural service department, Minnesota Power & Light Company; Dean Holm, executive secretary, Minnesota State Planning Board, and others discussing the subject from every angle. The association to further this activity has developed for its members a loose-leaf information and data book with eighty-seven pages already available.

Adequate wiring promotion was covered by A. L. Abbott of NEMA, and the possibilities of profit in lighting sales by W. T. Harrison, Westinghouse Lamp Company, and C. T. Bremicker, Northern States Power Company.

The program also included a discussion of electrical safety education by Dewey W. Johnson, state deputy commissioner of insurance and fire marshal.

Boston Contractors Play Host to Inspectors

More than two hundred members and guests of the Master Electricians' Association of Boston attended the dinner meeting held on February 3 at the Boston Chamber of Commerce Building. The entire staff of the Wire Division, City of Boston Fire Department, attended as guests of the association.

Peter F. Dolan, superintendent of the Boston Wire Division, gave a résumé of the character of service conducted by the men of his division. Arthur L. Abbott, representing NEMA, spoke on "The Value of a Uniform Viewpoint on Electrical Codes and Ordinances." He also outlined the trend toward uniform State legislation in wiring regulations.

John W. Scott, president of Buckley & Scott Utilities, Inc. of Boston, outlined the progress and potentialities of air conditioning within a 20-mile radius of Boston.

Lawrence W. Davis, general manager, N.E.C.A., in the concluding talk of the evening, outlined the history and future of electrical contractor leadership. The highlight of his talk, was the association's "Pledge of Cooperation."

The committee in charge of the meeting included George W. McShane, chairman; Morris Feldman and Fred Dudley, working with President John J. Reddington.

Have Not Sold Wiring Well Says Power President

Industry cooperation, adequate wiring and rural electrification were stressed at the annual meeting of the Wisconsin Electrical Association held at Madison on February 3 and 4. Earl N. Peak, president, N.E.C.A., and O. S. Loomis, state REA director, explained the rural electrification program pointing out its opportunities to the industry.

Speaking on the subject of "Cooperation in the Electrical Industry," Grover C. Neff, president and general manager, Wisconsin Power and Light Company, placed particular emphasis on the need for adequate wiring promotion.

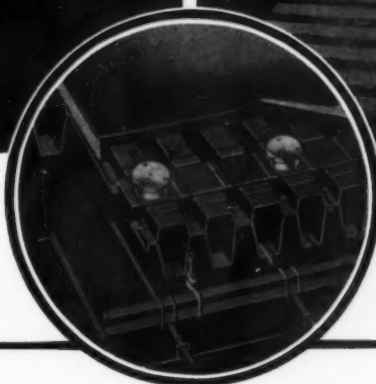
"I do not believe," said Mr. Neff, "that we have done a good enough job of selling the value of proper wiring. Once the owner of the home, store or



A WING corridor in the new Gallinger Hospital in Washington, D. C., where the Robertson Steel Floor System was used. Every cell of Robertson Flooring under this finish of rubber tile, is available for future use as new electrical needs arise, or as changes in wiring are required.



THE SAME corridor before surface finish was applied, showing the Robertson Floor cells with cell feeders in place. The feeder at the left carries Nurses Call wiring, the feeder immediately to its right carries Radio and Telephone wiring, the feeder on the far right carries 110 V. wiring.



How the **ROBERTSON STEEL FLOOR SYSTEM** *benefits your customers . . . and YOU*

THE new Robertson Steel Floor System provides a floor that is 100% electrically available! It is composed of hollow, parallel steel cells, six inches apart . . . and each of these hollow cells is a protected wire raceway! Obviously, such a system with its almost limitless capacity for carrying wiring of all sorts, is better able to serve your customer's electrical needs than floor constructions with only a fraction of its electrical availability. Its use is a definite safeguard for your cus-

tomers' entire building investment, for it insures his building against the premature electrical obsolescence which faces so many buildings as new uses for electricity are developed, and new services required.

For you, the use of the Robertson System usually means a larger electrical installation, because of the

overall area it serves. Therefore, in the interests both of your customers and yourself, why not write us for free copies of our brochure "New Life for Buildings" and our special technical bulletin giving complete details? Address H. H. Robertson Company, 2003 Grant Building, Pittsburgh, Pa.

ROBERTSON
STEEL FLOOR SYSTEM

factory, is sold on the value and importance of proper and adequate wiring, he will not object to paying a fair price for it.

"I realize that the cost of wiring must be held within reasonable limits, but certainly those limits should not be so low as to bring about a wiring job which will not render satisfactory service to the customer.

"In the interests of the customer and in the interests of the industry I urge you to do what you can to prevent the installation of inadequate wiring. If anything can be done to curb or eliminate the wiremen who really do not appreciate the importance of adequate wiring and who will eliminate essential features of a good wiring job in order to get the job, it should be done. I have no suggestions to make as to how it can be done but can assure you that the utility industry will be in sympathy with any legitimate move which tends to keep the wiring in the hands of capable and reliable men who understand and know the business of proper wiring."

The election of officers resulted as follows:

M. F. Hodge, Medford, president; M. J. Rilling, Wausau, vice-president; M. L. Carey, Wisconsin Rapids, secretary; Wm. Merkel, Marshfield, treasurer. Members of executive committee in addition to officers, Wm. Chamberlain, Ladysmith; E. P. Kissinger, Waupaca; E. M. Streich, Merrill; Chas. L. Kehl, Green Bay; Robt. J. Nickles, Madison; H. F. Trester, Milwaukee; Roy W. Springer, Superior; R. Poland, Sparta.

New Testing Laboratory Inspection

The new testing laboratory in New York of Underwriters' Laboratories was open for inspection to members of the industry on February 7. The new quarters, by having all equipment on one floor, will greatly facilitate examination of electrical products submitted for approval.

Kitchen Modernizing Campaign Under Way

Sponsored by NEMA and EEL, the National Kitchen Modernization campaign has started with the distribution by the bureau in charge of this activity of 20,000 copies of a plan book. The national organization is complete and is now engaged through its field representatives in establishing local organizations.

"I think we may confidently expect," says George E. Whitwell, chairman of the National Bureau, "that during 1936 millions of homemakers will become aware of the inadequacy of their present kitchens and that desire will grow for kitchens modernized by the installation of electrical equipment. This will

be accomplished by advertising and publicity carried on by local groups through newspapers and other promotional methods. I expect that in very many communities model electric kitchens will be set up and will be well attended by the public. I anticipate extensive kitchen planning to stimulate interest among homemakers in visualizing kitchen modernization.

"The nation is ready for this forward step. If we in the electrical industry but have the vision and faith to do our part, great progress will be made toward our business recovery."

NEMA Applies for Trade Practice Conference

The application of the National Electrical Manufacturers Association for a trade practice conference has been accepted by the Federal Trade Commission.

Atlanta Appoints Industry Relations Committee

The Atlanta Chapter, N. E. C. A. gave a dinner on February 10 to the members of the local electrical industry, at which time a committee was appointed to parallel as nearly as possible the National Joint Industry Development Committee. This committee, composed of two men each from the utilities, contractors, wholesalers and manufacturers, is organized to promote a better feeling between the different branches of the local industry, and to take up such work as the national committee may outline.

J. M. Clayton, president of the Georgia association, states that the Atlanta members hope to iron out some of the local difficulties that have been facing them for the mutual benefit of the entire industry.



SOUTHEAST INDUSTRIALISTS: Wilson L. and George F. Stratton of the Armature Winding Co., Charlotte, N. C., conduct one of the very large motor service shops in the south, devoting their time entirely to shop work and apparatus sales. An important department of their business is the reconditioning of large transformers, for which special winding and testing equipment has been provided. They posed beside some 25 k.v.a. 2300/6900-volt transformers which were designed and manufactured in their shop.

New San Francisco Officers

Clyde L. Chamblin, former president of the San Francisco and California State associations of Electragists and of the national association, was elected president of the San Francisco Electrical Contractors Association on Jan. 30. With him were also elected a board of directors representing the conservative group in the San Francisco association. Louis Douat, general manager of the Buzzell Electric Works, San Francisco, was named vice-president, and Ed Martin, Sterling Electric Company, was re-elected secretary, as was Ed Dowd, Dowd-Seid Electric Co., treasurer. The board of directors consists of George Smith, Smith Electric Co.; Kenneth Ryals, Stone-Ryals Electric Company; C. B. Kenney, of Kenney Bros.; F. O. Sievers, of Kuchel-Sievers; Pete Decker, Decker Electric Construction Company; H. C. Reid, and Sam Radelfinger, Radelfinger Brothers.

In accepting the presidency Mr. Chamblin enunciated a policy of conservatism and greater economy in the administration of the association's activities. Simplification of the procedure and methods of the association was also promised.

To Promote Tagged Residential Fixtures

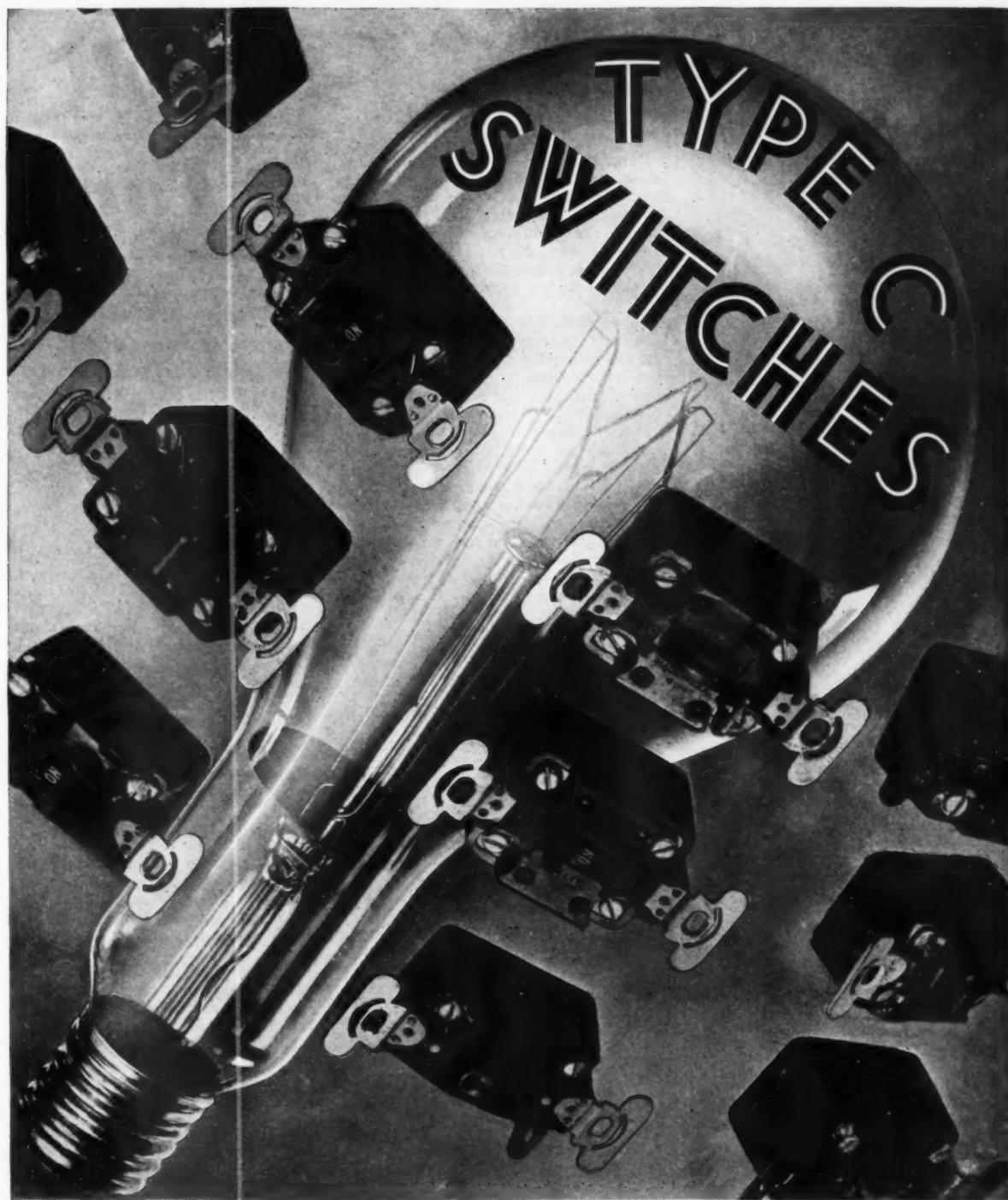
The Artistic Lighting Equipment Association, New York, N. Y., is preparing a sales and advertising campaign on selected residential fixtures. T. Y. Williams, director of the association, states that they have requested the Illuminating Engineering Society to consider the establishment of minimum standards for these fixtures, on a basis similar to the standards adopted for the I.E.S. study lamp. Fixtures conforming to these standards will carry tags certifying to their approval.

At the present time the campaign is in the organization stage, with about thirty manufacturers actively participating.

Safecote Patent Upheld

The Frederickson patent covering flame-retardant and moisture-resisting braids with slick finish for insulated wire, and under which Safecote rubber covered wire is made, was held in the United States District Court for the Eastern District of New York on February 13 to have been infringed by the Circle Flexible Conduit Company in the suit brought by National Electric Products Corporation. In rendering the decision, the court stated that it had no hesitation in finding that Frederickson invented a new process and a new product and that the patent is valid.

Rubber-covered wire manufacturers representing approximately 90 per cent of the output have been operating for



10 — 20 — 30 Amperes — **ARROW** Bakelite enclosed bases
 a line complete for all Type C lamp loads; make dust- and dirt-proof switches. Me-
 more than adequate to handle the smashing current-
 surge of Type C lamps. * * * * * mechanically and electrically engineered for LONG
 LIFE under tremendous initial overloads. * *

ARROW ELECTRIC DIVISION
 THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.



BETTER

Modernization

**CALLS FOR
QUAD QUICK
DETACHABLE
REFLECTORS**

A line of shallow bowl reflectors for general purpose lighting. These are practical as well as economical reflectors have weather-proof cadmium



plated fittings which permit their use either outdoors or indoors—Porcelain enameled green outside and white inside.

A better modernization job can be done with QUAD Quick Detachable Reflectors. These highly efficient lighting units will not only help you land many jobs through demonstration but will be the source of much repeat business.

Go after industrial modernization work—you'll find it profitable and easy to get with QUAD Quick Detachable Reflectors.

In addition, you'll find QUAD has a line of fittings which are interchangeable and permit the use of both shallow bowl and dome reflectors shown as well as other Q D Reflectors and globe holders—Reflector sizes range from 8 to 16 inches.

The QUAD special dome reflector when combined with three different types of socket fittings provides a wide range of applications. Strongly



constructed and weatherproof. Sockets easily wired and reflectors can be quickly attached and removed without disturbing wiring.

**QUADRANGLE
MANUFACTURING CO.**
30 So. Peoria St. - - - Chicago

some time under a license to produce Safecote wires. It is hoped that one of the results of this decision will be the stabilization of the rubber-covered wire market.

Pay Flatland Tribute

Responding to a tribute to his untiring energy while president of the San Francisco Electrical Contractors Association, paid him by the presentation of a gift at a record meeting of the association, Lloyd Flatland stated what to him appeared to be the fundamental need for contractor organization.

"If you will stop to realize" said Mr. Flatland, "that the consumer, in our case the general contractor, sets you at each other's throats in order to benefit himself with lower prices, how he talks to you about what your competitor is offering or doing in order to break you down, how he keeps you at your wits end to run your business in a way that is respectable and reasonably profitable, you will realize how much better it is to have an organization like this, in which you can iron out your differences by talking things over, and hold fast to your own business interest because you know that your competitor is holding to his."

Morton Havens

Morton Havens, for years one of the leading contractors of Albany, died on February 8 at the age of sixty-one.

Mr. Havens, who was the inventor of the condulet now being manufactured



by Crouse-Hinds Company, began his study of electricity with the old Edison Machine Works in Schenectady, the forerunner of the present General Electric Company, which with others he represented at the first Chicago World's Fair in 1902. He was engaged in the electrical business in Albany for approximately twenty-five years. His construction business was sold in 1927 to what is now known as Meginniss & Company, Inc. The Havens Electric Supply Company, Inc., continues in the wholesaling field.

A Roll o' Tape

**Electrical Flashes
gathered among the
big wire and pipe men**

by
**Electrical Contracting's
Field Editors**

WITH rural transmission line construction beginning to materialize, R. H. Bouligny, Inc., of Charlotte, N. C., is in the headlines again. Mr. Bouligny reports having a \$90,000 project in Kansas, one for about \$66,000 in Mississippi, and a large job in South Carolina.

DEALERS in used and reconditioned power sewing machinery in the Stone St. section of Brooklyn, N. Y., report a brisk trade in rebuilding this type of equipment for export to Japan.

WITH an industrial service clientele that requires motor rewinds up to 600 hp. in size, Charles H. Leppert of Hartford, Conn., makes the claim that his shop has yet to purchase a set of ready-made coils.

EXPANSION to a recently acquired building next door has given Louis Litsky of L. & P. Electric Co., Brooklyn, N. Y., an opportunity to plan a modernized motor repair plant that can take care of an increasing industrial business.

AMONG the interesting and profitable tasks that fall to the well-equipped industrial electrical contractor may be cited the installation of an industrial monorail system nearly 2 miles long by the L. & P. Electric Co. of Brooklyn, N. Y., for one of its regular factory customers.

SLOW jobs mean prolonged guarantees of materials and workmanship, and therefore place an unreasonable maintenance burden upon the electrical contractor, is the experience of Julius Hoffman of J. Hoffman & Co., Inc., Brooklyn, N. Y. A large hospital job

Electrical Contracting, March 1936

PANTHER and DRAGON TAPES

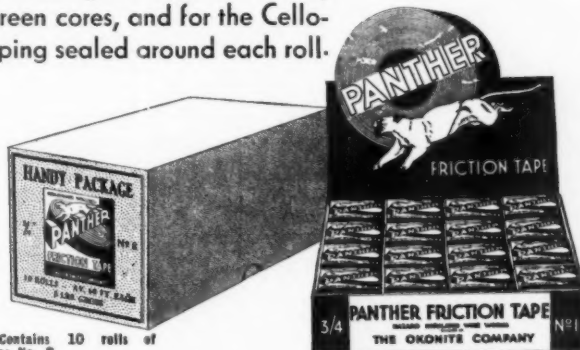


Panther Rubber Tape. Nos. 8, 4, 2 and 1 in individual boxes.



Dragon Friction Tape. Nos. 8, 4, in individual boxes.

Panther and Dragon Friction and Rubber Tapes are outstanding among commercial tapes because they are backed by the reputation and experience of the Okonite Company, for over half a century a leader in the insulation field. This accounts for such features as longer life, greater tensile strength and adhesiveness, distinctive green cores, and for the Cellophane wrapping sealed around each roll.



Handy Package. Contains 10 rolls of Panther No. 8.

Panther Counter Display. Contains 32 rolls of Panther No. 1.



Panther Display Rack. Contains 10 pounds of Nos. 8, 4, 2 and 1 Panther Tape.

HAZARD INSULATED WIRE WORKS

Division of

THE OKONITE COMPANY

Factories:

Wilkes-Barre, Pa.

Passaic, N. J.

NOTHING GRIPS LIKE A



ILSCO SOLDERLESS LUG

Just insert the wire, tighten the screw, and the wire is forced into permanent, solid contact—all in a few seconds time. It's the triangular wedge formed by the tang and V-bottom collar, that grips wires, (solid or stranded) with the tenacity of a bulldog. Yet wires are not flattened or separated; no set screw contact to cut or shear them. No special tools required to make the connection!



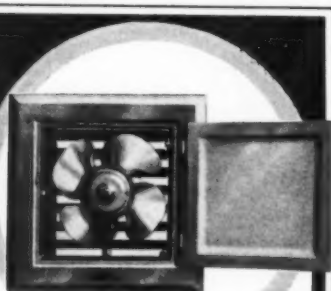
Learn more about the Approved ILSCO SOLDERLESS LUG. Send for literature, prices, and samples.



IlSCO solder lugs show the size of the largest wire they will take.

ORDER FROM YOUR JOBBER

IlSCO Copper Tube & Products, Inc.
5629 Madison Road, Cincinnati, Ohio



Full Automatic Wall Box Kitchen Ventilator Fan

Built-in type for permanent installation, it is telescopic in design, adjustable to wall thickness 7" to 13". No wood or metal frame or screws in the plaster, wood, or brick necessary. Inside and outside polished cast aluminum; wall box rust resisting steel. Quickly installed in old or new homes. Automatic switch and shutters controlled by opening and closing of the door. 16" silent blade fan; available for A.C. or D.C.; A.C. non-radio interfering. Write for bulletin and prices.

SIGNAL ELECTRIC MFG. CO.
Menominee, Michigan, U. S. A.

OFFICES IN PRINCIPAL CITIES

SIGNAL

that was begun in June, 1934, is not yet completed, although some portions of it are in normal operation. The contractor's guarantee clause runs, however, for a year after final acceptance of the job, thus throwing all normal repairs and adjustments upon the contractor during the interim.

BEING a graduate mechanical engineer has proved helpful to Charles Michaels, industrial contractor and motor service specialist of Brooklyn, N. Y. Because of this training, the problems that occur in belt, chain or gear transmission, diesel power and other machinery modernization efforts are more or less "down his alley."

"WHEN will chain store operators ever learn to allow elbow room around their meter and panelboard locations?" Asks T. B. Cooper of the Cooper Electric Co., Columbia, S. C. After recently doing several local remodeling jobs of that nature he is convinced that something needs to be done about it.

UNDERGROUND construction jobs are no puzzle to "Thad" Harrison of Harrison-Wright Co., Inc., Charlotte, N. C. In doing heavy industrial construction work in the southeastern states this company took on the installation of commercial telephone lines and cables, both overhead in open country, and underground along the busier streets.

TO PREVENT the accumulation of broken coils of wire or cable, the Perry Electric Co., Hartford, Conn., keeps all solid coils in a separate stock room. Before a new coil is ordered out, the odd lengths are checked over to work them up. Often a job requiring 210 ft. of wire would receive a full coil, although several broken coils are already on hand.

THE disposition of trade-in motors is a never-ending shop-keeping problem, according to Benjamin Fiske of the Prusack Electric Co., Brooklyn, N. Y. Motors which haven't a good resale value are immediately taken apart, and only the most valuable parts are saved for future use, while the remainder is junked.

A NEW storage building that is being erected in the back yard of the Southern Electric Service Co., Charlotte, N. C. is expected to pay for itself through reductions in material handling costs. W. H. Smith explains that trucks will back into the middle section to be loaded with tools and supplies that will be stored in rooms on either side. This will eliminate all such items being brought in and taken out of the service shop building where space is valuable for shop production.

RECIPROCITY has certainly proven its advantages to three service shop operators in Charlotte, N. C., according to J. McL. Jones of the Jones Electric Repair Co. In addition to a friendly inter-change of service shop materials at a nominal service charge, these men have maintained a high regard for one another's customers. Mr. Jones claims he refuses to go in for competitive industrial contracting, but only does such installation work as his customers are willing to have done on open order.

BESIDES the routine duties of inspection work L. H. Hardin, electrical inspector of Charlotte, N. C., welcomes the responsibility of designing good layouts for that city's public buildings. The new wiring and lighting system in the public library is one of the best in the south, and includes sixty specially-shaped reflectors for the book stack aisles. Now that this job has been completed by the Robinson Electric Co., Mr. Hardin is very proud of his efforts.

BY working intelligently with an out-of-town factory motor service shop, R. H. Haile of the R. H. Haile Electric Co., Columbia, S. C., saves that organization some expensive emergency calls to the Columbia area and at the same time enhances his own record of operations considerably.

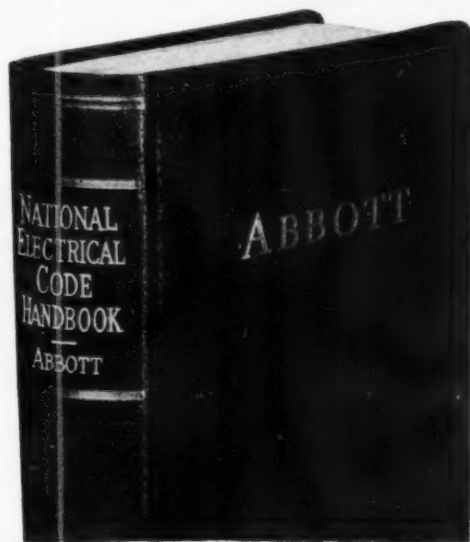
QUALITY armature reconditioning jobs are made to look the part when they are ready to leave the shop of H. N. Crowder, Jr. Co., Allentown, Pa. Red moisture resisting enamel is applied upon the banding twine which adjoins the commutator. This touch of color, in combination with bright copper segments and the black varnished coils, makes for a finished appearance.

APPROXIMATELY fifty good-sized commercial lighting jobs have been done by the Robinson Electric Co., Charlotte, N. C., since the Better Light-Better Sight campaign began, says Ralph K. Robinson. One of these installations included twenty-eight 1,500-watt units for a cafeteria that went "light conscious." Another job required the rewiring of a building only four years old, to double its original capacity so as to allow raising its lighting intensities from 7 up to 35 f.c.

A MINIATURE "house of magic" in the offices of John A. Grenzign & Son, Brooklyn, N. Y., is the outgrowth of commercializing John A. Grenzign's hobby of collecting rare mineral specimens. Various experiments caused the installation of special lights in a dark room to reveal the hidden beauty of fluorescent and phosphorescent minerals with such illuminants as "black light," argon, cobalt-filtered mercury vapor, and a specially constructed

Just Out!—New 1936 Third Edition

**Simplifies
and explains
the
NATIONAL
ELECTRICAL
CODE**



**—covering latest
Code rules**

Here is a complete revision of Abbott's useful Handbook, covering all changes, new rules, etc., in the latest National Electrical Code. Use this book to get work done according to the Code. Gives rules and requirements for all jobs—what they mean—how to apply them. This unusual book, planned for quick reference use by busy, practical men can also be used by anyone who wishes to make a thorough study of the National Electrical Code.

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by ARTHUR L. ABBOTT

Third edition, 545 pages, 5 x 7½, flexible, fully illustrated, \$3.00

How this book helps you:

Valuable data for the electrician, inspector, contractor and architect

- definitions of the terms used in the Code
- types of wiring approved under given conditions
- requirements pertaining to standard materials and apparatus and to the standard methods of installing such materials and apparatus
- general requirements applying to all wiring systems
- automatic overload protection covered both in section on general requirements and in connection with specific applications
- simplified application of Code data pertaining to motor installations
- special requirements pertaining to emergency lighting, high-voltage equipment, services, grounding, design of installations, etc., etc.

- Enables the user to grasp readily the plan, scope and purpose of the National Electrical Code requirements
- Groups Code rules in practical, handy way, according to jobs to which they apply
- Clarifies rules with simple discussions, diagrams, and illustrations
- Certifies your methods; keeps you up-to-date; helps your work pass official inspections

Examine this up-to-date third edition

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Send me Abbott's National Electrical Code Handbook for 10 days' examination, subject to approval or return. At the end of 10 days I agree to pay \$3.00 plus a few cents for postage and delivery, or return the book postpaid. (We pay postage on orders accompanied by remittance.)

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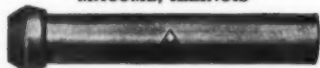
For Residence Wiring

The Best and Safest Method is a properly installed KNOB and TUBE job. Be sure and get the



Assembled Knob because it "HAS A GRIP LIKE ITS NAMESAKE."

ILLINOIS ELECTRIC PORCELAIN CO.
MACOMB, ILLINOIS



THE
YOUR JOBBER HAS IT
**BEST
TAPE
MADE**

10,000-volt high-frequency ion arc lamp. Mr. Grenzic at seventy-three enjoys being a "minerologist" while August Grenzic carries on with the electrical business that was started in 1909.

OUT at ten and back at two, during which time two men roughed in a 23-outlet home for the Milam Electric Co., Columbia, S. C.

LATE bulletins covering new electrical products are available to contractors at the electrical inspection department offices in the city hall at Brooklyn, N. Y. According to G. W. Regan, chief inspector for the borough of Brooklyn, their bulletin rack is a popular source of free information for visiting contractors.

CLOSE contact with the everyday business problems of industrial contractor members has convinced Louis D. Kennedy, executive secretary of the Kings County (Brooklyn, N. Y.) Electrical Contractors Assn., Inc., that these men are an increasingly important factor in the selection of motors, control and other industrial electrical products.

TOO much cannot be done to elevate the status and efficiency of the small motor expert, in the opinion of Carl Badura, Electro Winding Service Co., Long Island City, N. Y. This work is looked upon largely as "small change," yet in comparison with the more simple job of rewinding large stators, there are many intricacies and pitfalls involved that make small motor work deserving of just compensation.

IT isn't often one sees a demonstration of 100,000 volts in all its fury, but at the Armature Winding Co., Charlotte, N. C., it's all in a day's work. A department for testing, drying out and reconditioning high-voltage transformers and bushings has a testing outfit with a special 50 kva. outdoor transformer and indoor oil-immersion test cell which are needed for such work. There's quite a corona display when those 100 kv. flashes occur across ceiling-suspended air-gaps.

JUST to show what is meant by modern lighting sales, F. J. Seastrunk of the Seastrunk Electric Co., Columbia, S. C., reports how his lighting specialist P. P. Herbert is bearing down. One floor in a large local office building re-lighting program now has 9,750 watts where 2,800 watts had been considered a bang-up job not so long ago. The old readings of 2 to 4 f.c. have been hiked to an average of 35. Another \$46.00, five-fixture job required \$162.00 for rewiring. The owner says, "Swell. Why did you keep this kind of lighting a secret so long?"

Trade Notes . .

Newman Heads Up GE Conduit and Wire Sales

The Appliance and Merchandise Department of the General Electric Company, Bridgeport, Conn., has consolidated the conduit products and the code



wire sales sections into a section to be identified as conduit and wire sales with A. E. Newman, (left) formerly manager of conduit products sales, as manager. Mr. Newman started in 1910 with the Sprague Electric Co. which was later acquired by the General Electric. He entered construction material sales in 1923, and three years later was transferred to the supply house section where he was service manager and purchasing agent of the Lake States G-E house at Columbus, Ohio, and later assistant sales manager of the supply house department in charge of purchasing. He went to Pittsburgh in 1930 as sales manager of the pole line hardware division, and in 1933 returned to Bridgeport as manager of conduit sales.

W. H. C. Smith, (right) manager of code wire sales since 1922 has been made assistant to J. H. Crawford, manager of the construction material sales division. Mr. Smith started with the General Electric Company in 1900 in the wire and cable section at Schenectady. He later became assistant to Wallace S. Clark, manager of the cable division. In 1922, with the formation of the Merchandise Department, he went to Bridgeport as manager of code wire sales. Mr. Smith is chairman of the Rubber Covered Building Wire Section of N.E.M.A.

F. A. Faron has been appointed manager of the New Haven, Conn., office of the General Electric Co.

The Allen-Bradley Co. sales office at Grand Rapids, Mich., has been moved to 410 Houseman Bldg.

The Wadsworth Electric Mfg. Co., Covington, Ky., announces that its Chicago, Ill., office has been moved to 600 W. Jackson Blvd., Room 404-404A.

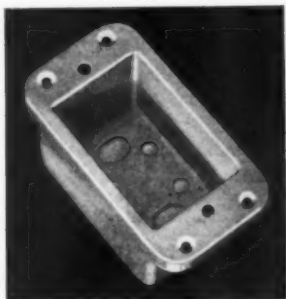
General Electric Co., announces that Neil Currie, Jr., formerly manager of its Philadelphia works has been made manager of the Fort Wayne, Ind. works, succeeding Walter S. Goll, who retired after thirty-eight years of service to be available for special assignments. R. V. Good succeeds Mr. Currie as manager at Philadelphia.

— to save time and money in your buying

New Products . for March

Porcelain Outlet Boxes

A line of switch and outlet boxes made of white unglazed porcelain. Designed particularly for use with knob and tube, and other insulated systems of wiring in



farm buildings, residences or other types of frame buildings which are adapted to such wiring methods. Metal inserts are provided for receiving the box cover or wiring device screws. Knockouts are provided for single conductors or for cables. The outlet boxes are available in 3½-in. and 4-in. sizes. Illinois Electric Porcelain Co., Macomb, Ill.

Arc-Extinguishing Safety Switch

High circuit rupturing ability is claimed for the Vacu-Break line of safety switches due to partitioned arc extinguishing chambers which enclose the contact area of piston-action floating blades. The self-aligning blades are said to be so closely sealed



that their movement evacuates air and minimizes burning of the arc chamber or the contacts. Because of this construction, less dirt and other foreign matter is said to enter the contact areas. Endurance tests are said to have been successfully made with the 60-amp., 3-pole switch breaking a 1000-amp., 460-v., 33 per cent power factor load on a 125 h.p. motor with its rotor stalled. Three lines of switches are being made: Master (type

A), Standard (type C), and Junior (type D), all with quick-make and quick-break mechanisms. Modernistic lines have been adopted for both the housing and operating lever. Other features of design include smaller overall cabinet size, solderless lugs, fuse tension grips, and modern-styled handles. Bull Dog Electric Products Co., Detroit, Mich.

Oil Circuit Recloser

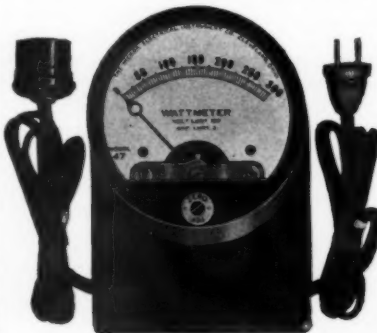
For 2200 to 7500-v. suburban and rural distribution circuits requiring an automatic oil circuit recloser of low current trip value. The FP-19 recloser is rated 8 amps. interrupting rating. It opens promptly on a short circuit, then closes



automatically after a few seconds. This operation is automatically repeated three times on sustained faults, after which the device will lock itself open. Mounted in a weather-proof case for pole mounting and weighing 70 lbs., it requires no control power, only two connections to the distribution circuit. General Electric Co., Schenectady, N. Y.

Portable Wattmeter

Handy appliance testers are said to withstand hard portable service in testing the wattage consumed by refrigerators,



washers, and other electrical household appliances. Made in three models ranging from 0-300 to 0-1500 watts capacity for use on a.c. circuits below 150 volts. The wattmeter is of the dynamometer type said to be unaffected by external fields. Mounted on bakelite base complete with double end attachment cord and plugs for quick connection to the appliance. The Hickok Electrical Instrument Co., Cleveland, O.

Gear-Motors

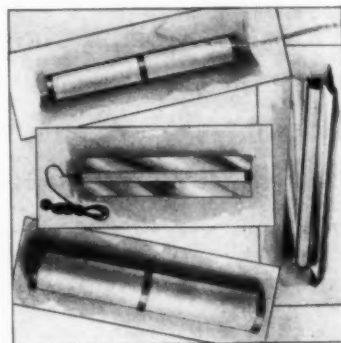
Fractional-horsepower gear-motors for direct connection to stokers, conveyors, low-speed pumps and other applications requiring special speeds. Available with right-angle shaft drive in single and



double-reduction types; and with parallel shaft drive in single, double and triple-reduction types, at speeds as low as 6 r.p.m. Gear cases incorporate phosphor-bronze worm-gears and nickel alloy steel worms. The low-speed output shaft has two roller bearings. Wagner Electric Corp., St. Louis, Mo.

Lumiline Reflectors

Seven types of reflectors for lumiline lamps in either 12-in. or 18-in. sections which may be adapted to wall, corner or case lighting. Open types are finished

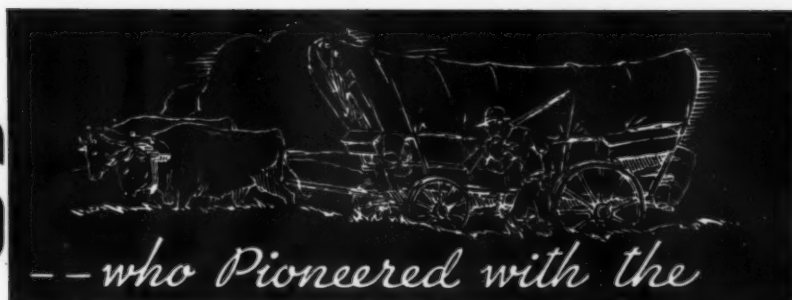


in polished chromium, while the enclosed types, using a flashed glass cylinder, are finished in satin cadmium. Each set of sections includes grounding means for connecting several sections end to end. The F. W. Wakefield Brass Co., Vermilion, O.

Circuit Breaker Lever

The type MH-6 manual operating lever for type FK-42 switchboard type oil-blast circuit breakers is said to be trip-free at any part of the stroke, has a spring-actuated impact trip that assures a positive trip with low volt-ampere burden, and is quick-make and quick-break, thus conserving the breaker contacts and contributing to longer breaker life and reduced

It was
COLT'S



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first

MULTIPLE BREAK SLIDING SAFETY SWITCH MECHANISM



TYPE "A" QUADBREAK

The new Heavy Duty Quadbreak Type "A" Switches are simple in design—ruggedly built throughout—efficient under the toughest conditions. Unit block construction—no concealed switching mechanism—visible for quick inspection. New boxes designed for greater strength—front operating handles allow closer banking. Plenty of wiring space—they install quickly, stay put for a life-time. 575 Volt, Fusible and Non-Fusible.

—and now—five years later—our principal competitors are building switches—copied after the same history making design! But not one of them has been able to improve—or equal—the original Noark idea. You get Quadbreak and Dualbreak efficiency only in

COLT-NOARK SAFETY SWITCHES



Type "A" Dualbreak

The DUALBREAK mechanism is similar to the QUADBREAK—rugged, simple, positive in operation. New cabinets—interlocking covers. 250 Volt, Fusible and Non-Fusible.



Type "C" Dualbreak

The 575 Volt Type "C" Noark Safety Switches have DUALBREAK mechanism. Unit block construction—generous wiring space—close banking cabinets. Fusible and Non-Fusible.

Send for complete description of Colt-Noark Safety Switches

COLT'S PATENT FIRE ARMS MFG. COMPANY, HARTFORD, CONN.

ELECTRICAL DIVISION

BOSTON, NEW YORK, CHICAGO, PHILADELPHIA

H. B. SQUIRES CO., Pacific Coast Representative

imitation is the sincerest form of flattery!

maintenance. It is for back-of-panel or remote mounted breakers, and may be non-automatic or automatic with one, two, or three times or instantaneous trip coils. Time or instantaneous undervoltage devices can be applied. General Electric Co., Schenectady, N. Y.

Wall-to-Ceiling Wiremold Elbows

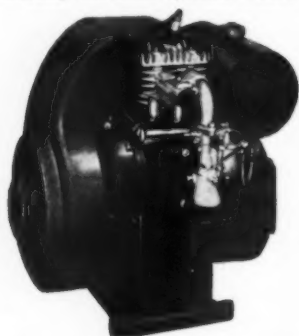
Internal elbows for making twisted corner turns with Wiremold when running from flat ceiling sidewalls to wall outlets; or for running from wall outlets along the



edge of door or window trim. Made in right or left types for 90 deg. twist with a 90 deg. turn, and in two sizes that fit No. 200 or No. 500 and No. 700 Wiremold. The Wiremold Co., Hartford, Conn.

Generating Plant

A light-weight generating plant rated 350 watts at 110 v., 60 cy., for summer cottages and camps, also sound cars, public address, and other systems where a.c.



current is necessary. This machine is fully enclosed and uses a 1 h.p. four cycle, 1800 R.P.M. engine that has magneto ignition, float feed carburetor, governor, and pressure lubrication through the crankshaft to the connecting rod. Available in standard and light-weight types for portable use. D. W. Onan & Sons, Minneapolis, Minn.

Insulating Enamel

Dolflex Red No. 3 is claimed to be a flexible and elastic oilproof enamel which will not rub off, will not flake or crack and which withstands severe abrasion. Developed for use on the ends of commutators, it has many other applications in cases where oil creepage would cause failure. Packed in quarts, 1-gal. and 5-gal. cans. John C. Dolph Co., Newark, N. J.

Watertight E. M. T. Fittings

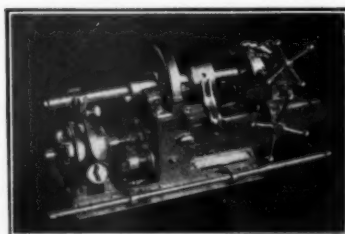
"Hexround" couplings and connectors for electrical metallic tubing are said to provide a rigid and watertight fitting



with but a few turns of a wrench. A gland nut forces an interior brass cupping ring against the edge of a split steel ring to provide a metallically caulked joint under compression. The Thomas & Betts Co., Elizabeth, N. J.

Threading Machine

To cut, thread, ream and chamfer all sizes of pipe from 1/4 to 2-in., to cut and thread rods or bolts from 1/4 to 2-in., and



to operate geared tools to cut and thread 2 1/2 to 12-in. pipe. The Model A, Special pipe machine has a wheel-and-roller cut-off, and may be had with a Universal adjustable diehead for changeable dies, or with self-contained dieheads. Beaver Pipe Tools, Inc., Warren, O.

Solderless Terminals

A line of set-screw type solderless terminals made from seamless copper tubing which, because of being the same size as standard copper lugs, are said to be of particular advantage where spacings of



live parts must be held to a minimum. May be applied to panels or safety switches and require only a screw driver or pliers, because there are no loose parts. Made in sizes to take wires from No. 8 to 4/0 and also in round-end, standard two-hole, and center-formed types for back connected stud work. The Dante Elec. Mfg. Co., Bantam, Conn.

Ratchet Diestock

Armstrong No. 2R ratchet stock for adjustable dies, threads from 1/4-in. to 1-in. pipe, while the No. 3R ranges for 1/4-in. to 2-in. These tools are recommended for tight spots, in corners, ditches and between beams. Threads can be made with less than a quarter turn. The ratchet movement is quickly reversible. A pawl trigger is conveniently located for setting to run right or left hand threads or to set in neutral. Straight threads are claimed by reason of a 3-point self-centering guide

which replaces bushings. This stock can also be had for solid dies. Armstrong Mfg. Co., Bridgeport, Conn.

Antenna System

Taco master antenna systems for concealed wiring in new buildings, or exposed wiring in old buildings, are said to be available in combinations for any size and kind of installation. Up to twenty-five



receiving sets are claimed to operate on a single aerial and downlead. The system comprises a master antenna unit and downlead transmission line, and a separate set coupler for each set to be operated on the system. Couplers fit a standard outlet box and polarized plate, or they may be installed exposed because the surface type coupler is encased in an individual base and bakelite cover. Technical Appliance Corp., Long Island City, N. Y.

Lite-Flo Reflector



A show window lighting reflector designed to utilize light formerly wasted on non-productive areas. A new stipple is included in the improved design of Lite-Flo reflectors, which is claimed to direct the light at the first point in the show window to meet the eye. Reflector & Illuminating Co., Chicago, Ill.

Plug Fuse

Blac-Link plug fuses when blown on light overload reveal a gap in the fusible



element against the white interior of the fuse. This feature is offered as eliminating guess work in locating blown fuses. Chase-Shawmut Co., Newburyport, Mass.

Electrical Contracting, March 1936



This switchboard installation demonstrates two things which it is important to know about Alcoa Aluminum Bus.

Note that the Aluminum Bus is connected to copper. This junction of dissimilar metals, when required by circumstances, is entirely feasible and efficient, under ordinary operating conditions.

The Aluminum Bus is used for the main run, where its lightness, and ease with which it is formed, jointed, and spliced, combine with its other advantages to show over-all economy.



Flats are shown in this installation. Also available in Alcoa Aluminum are tubes, angles, and Channeluminum, the exclusive rolled channel shape which combines great rigidity with unsurpassed electrical and thermal efficiency for heavy currents.

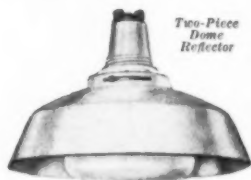
In form, as well as in capabilities, Alcoa Aluminum Bus is versatile, as well as the most economical bus system. No job is properly figured until Alcoa Aluminum Bus is figured. Ask us for the facts, now. ALUMINUM COMPANY OF AMERICA, 2197 Gulf Building, Pittsburgh, Pennsylvania.

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MULTI



Meet the demand for better and more efficient lighting by installing Multi enameled steel reflectors. They give full lighting efficiency—are rust-proof, and are easily cleaned. Ensure satisfaction by installing these long-lasting Multi enameled steel reflectors on all new and replacement work.



The "MULTI" 2-piece dome industrial fixture has a white diffusing glass globe with an all white reflector. The glass globe is held by a "MULTI" "Gripit" holder with internal finger support. No possible breakage from vibration or expansion.

Write for Complete Catalogue

**MULTI ELECTRICAL
MFG. CO.**

1840 W. 14th Street, Chicago

REFLECTORS

(Continued from page 66)

Barry Becomes Vice President of Arrow-H & H

Grosvenor C. Barry has recently been elected vice-president of The Arrow-Hart & Hegeman Electric Co., Hartford, Conn. For the past eight years, he has been connected with the company as export manager, industrial sales manager, and general sales manager.

Mr. Barry began his business career



with the Western Electric Co. in 1912 in the jobbing division, and from 1914 to 1918 was associated with the Hart Manufacturing Co. When the American Brown Boveri Co. was organized in 1926, he joined this firm as assistant vice-president, but resigned in 1928 to become associated with The Arrow-Hart & Hegeman Electric Co.

Cutler-Hammer, Inc., Milwaukee, Wis., announces the appointment of R. J. Eckstein, who has been with the company for twenty-five years, as manager of the Cleveland office at 405 East Sixth St.

A. H. Kahn has been made district manager of the General Electric Supply Corp. at Chicago, Ill., having formerly been operating manager for the corporation at San Francisco, Calif.

Miles E. Standish has been appointed sales manager by the Marble-Card Electric Co., Gladstone, Mich. Mr. Standish was formerly connected with Louis Allis Co., and other motor manufacturers.

The Allen-Bradley Co., Milwaukee, Wis., announces the appointment of S. A. Rhodes, 2015 Main St., Cromwell, Conn., to represent the company in its Connecticut territory, replacing R. B. Soderberg of Hartford.

General Kontrolar Co., Inc., Telechime Division, Dayton, O., announces the appointment of R. L. Chambers, 1212 California Ave., Denver, Colo., as its agent for Colorado, Wyoming, New Mexico, the Black Hill district of South Dakota, and western Nebraska.

Harnischfeger Corp., Milwaukee, Wis., announces the appointment of R. L. Mead in charge of sales in the Chicago territory for the complete line of P & H products, with offices at 20 N. Wacker Drive. He was former district sales manager for the Link Belt Co.

General Electric Co., Schenectady, N. Y., announces the appointment of E. N. Hume as manager of its industrial department; and George H. Reid as manager of its New York district industrial department. Mr. Hume, who succeeds the late W. W. Miller, entered the company's service in 1907, and Mr. Reid began in 1901.

Harnischfeger Corp., Milwaukee, Wis., announces the appointment of Charles R. Surface as sales manager of its electric motor division. Mr. Surface was formerly with the General Electric Co. and later with Westinghouse Electric and Mfg. Co. in charge of the building equipment department of the industrial division of the Chicago office.

James A. Smith, who for the past four years has been director of the Electrical Code Manufacturers in charge of the Identified Cord Campaign, and prominently identified with the I.A.E.I. promotion of public education on electrical safety, has resigned to become sales promotion manager for the Anaconda Wire and Cable Company.

Graybar Electric Co., Inc., New York, N. Y., announces the following changes in its organization: At Kansas City, Mo., J. G. Dean has been appointed credit manager, and M. O. McIlvain service manager; at Cleveland, O., R. D. Paine has been made assistant manager, and at St. Louis, Mo., Willard E. Henges has been appointed assistant manager. Its 79th distributing house has been opened at San Diego, Calif., with Bob Redfield as manager.

Carl M. Snyder has been named manager of the General Electric Co.'s home bureau, according to an announcement from Schenectady, N. Y. The home bureau will furnish an advisory and sales service to architects, engineers and others desiring a complete check of specifications affecting adequate wiring and lighting layouts, heating and air conditioning, electric kitchens, laundries, and other phases of home planning in which the company's products are represented. Mr. Snyder will have headquarters in the General Electric Bldg., New York, N. Y.

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Cable or Conduit Hanger Jiffy Clip

Now furnished in EVERDUR as well as Cadmium Plated Steel.



Cable or Conduit Hanger
Rigid Conduit— $\frac{3}{8}$ "— $2\frac{1}{2}$ "
Thin Wall— $\frac{1}{2}$ "— $1\frac{1}{2}$ "



Jiffy Clip
Rigid Conduit $\frac{1}{8}$ "— $1\frac{1}{4}$ "
E. M. T. (Thin Wall) $\frac{1}{2}$ " & $\frac{3}{4}$ "
Also BX Cable

Ask your Jobber

MINERALLAC ELECTRIC CO.
25 No. Peoria Street, Chicago, Ill.

New York City Branch
381 Fourth Avenue

Trade

Literature

Expansion Bolts: Loose-leaf book containing charts, tables, data and specifications on expansion bolts. The Rawlplug Co., Inc., New York, N. Y.

Floodlights: Bulletin 2299 with 52 pages of layouts and equipment specifications for thirty-one different kinds

Electrical Contracting, March 1936

of sports lighting. Crouse-Hinds Co., Syracuse, N. Y.

Horn Gap Switches: Type RT switches for sectionalizing rural transmission lines are illustrated and described in Bulletin No. 208-A. Schweitzer & Conrad, Inc., Chicago, Ill.

Voltmeters: A folder describing Ferranti electrostatic voltmeters for a.c. and d.c. measurements, in flush, projecting and portable types. Ferranti Electric, Inc., New York, N. Y.

Porcelain Outlet Boxes: Porcelain outlet boxes and switch boxes for insulated house wiring systems. Sheet 0-11. Illinois Electric Porcelain Co., Macomb, Ill.

Asbestos Wire and Cable: Specifications and construction data for National asbestos wires and cables are given in a 16-page catalog. National Electric Products Corp., Pittsburgh, Pa.

Synthetic Rubber: The story of Thiokol synthetic rubber development, "A Rubber Plantation in New Jersey," includes an outline of its uses for conductor insulation. Thiokol Corp., Yardville, N. J.

Fans: The 1936 line of Wagner portable fans, ceiling and ventilating fans is covered in a 16-page illustrated bulletin No. 178. Wagner Electric Corp., St. Louis, Mo.

Pipe Threading Machinery: An illustrated folder describing the "Model A special" motor-driven pipe machine and its accessories. Beaver Pipe Tools, Inc., Warren, O.

Fan Catalogs: A 26-page catalog No. X1149 describing Emerson fans for 1936, supplemented by No. X1150 covering the Seabreeze popular-priced line. Emerson Electric Mfg. Co., St. Louis, Mo.

Small Transformers: Where to use small control and signal transformers; how to select the right type and size, from tables of ratings and data. Bulletin GEA-1358-B, General Electric Co., Schenectady, N. Y.

Relays: A twenty-eight page catalog devoted to relays, timing devices, thermostats, pots and ladders, resistors, thermal links, insulators, and other Dunco specialties. Struthers Dunn, Inc., Philadelphia, Pa.

Lighting Fixtures: Mer-Tung indirect and semi-indirect commercial lighting equipment employing combinations of Mazda lamps with high intensity mercury vapor are illustrated and described in catalog No. 870. The Miller Co., Meriden, Conn.

Underground Cable: An 8-page bulletin No. 115 covering Hazard "Armortite" underground cable for airport,

street and highway lighting, power distribution, and other applications. Splicing and installation methods are discussed. Hazard Insulated Wire Works, Division of The Okonite Co., Wilkes-Barre, Pa.

Lumiline Reflectors: Catalog sheet DS 222 describes seven types of reflectors for adapting lumiline lamps to wall, corner or case lighting. The F. W. Wakefield Brass Co., Vermillion, O.

Watertight E. M. T. Fittings: Trade cost sheet T-17-A covers the "Hex-round" line of watertight couplings and connectors for electrical metallic tubing. The Thomas & Betts Co., Elizabeth, N. J.

Electric Furnaces: Leaflet TD 23, covers small electric box type furnaces for heat treating, also thermocouple types ranging from 1125 watts up to 11,000 watts. Harold E. Trent Co., Philadelphia, Pa.

Power Conductors: Data sheet E.D. 1626 covers wire tables and loading tables for Copperweld-Copper conductors ranging in size from 4/0 to No. 8 A.W.G. copper equivalents. Copperweld Steel Co., Glassport, Pa.

Fans and Ventilators: The Autovent line of propeller fans, fan houses, guards and louvers, self-contained and portable ventilators are described in a performance and data folder. No. F-250. Autovent Fan & Blower Co., Chicago, Ill.

Rubber Insulation: Bulletin No. 116, Hazard Peformite Rubber Insulation, describes a 35 per cent grade of rubber compound said to offer high resistance to aging. Hazard Insulated Wire Works, Div. of The Okonite Co., Wilkes-Barre, Pa.

Motors and Generators: Bulletin No. 225, an illustrated folder showing motors, motor-generators, gasoline engine generator plants, motorized speed reducers, pumps and blowers, and other products. Janette Mfg. Co., Chicago, Ill.

Time Switches: Bulletin No. 30 covers time switches of various types for controlling window lights, signs, etc.; "off-peak" water heater controls; temperature controls and poultry lighting controls. Bulletin No. 33 covers time controls for stokers and oil burners. Paragon Electric Co., Chicago, Ill.

Classified Advertising

Electrical Contractors Attention: Are you in need of an experienced estimator, engineer and draftsman? Can you use an expert electrical layout man who has had years of practical experience in preparing estimates and drafting; is thoroughly acquainted with electrical construction work in office buildings, theatres, industrial plants, housing projects and substations; is a conscientious and efficient worker, has a pleasing personality and can "sell a job" as well as "engineer" it? He is available for immediate employment at a fair living salary, commensurate with the work produced. If you can use such a man, address Box 31, Electrical Contracting, 330 W. 42nd Street, New York, N. Y.

TRICO "COLORTOP"



PLUG FUSES
"A Distinct Color
for Every Size"

meet all
Electrical Requirements

• Look at the rugged design and construction. The porcelain top affords a good grip and is the best insulator against electrical shocks and burns. EVERY TRICO "COLORTOP" FUSE has a white interior, clear mica window, and is guaranteed to positively "Show When It Blows" whether on slight overload or severe short circuit. The many improvements embodied in TRICO "COLORTOP" FUSES, which include cadmium plated metal parts, are entirely new and make them distinctive and superior to ordinary plug fuses. TRICO "COLORTOP" FUSES are real fuses—built for real service.

• Listed as standard by Underwriters' Laboratories.

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MILWAUKEE WISCONSIN

KNOW THIS FAMOUS WIRE CONNECTOR



Write for Free
TEST SAMPLE

IDEAL

**Solderless-Tapeless
WIRE CONNECTOR**

Ready to
Apply



Completed
Joint

Dependability, speed and ease of application and sure wire joints that save money are outstanding features of IDEAL Solderless-Tapeless WIRE CONNECTORS. Millions used yearly. Fully approved. Listed by Underwriters' Laboratories.

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Company
Street
City..... State....

SHERMAN SOLDERING ▼ LUGS

SHERMAN Soldering Lugs are superior to any others. They are seamless all around. The solder cannot leak out at closed end, making a messy job and wasting solder. Better conductivity is also secured. In sizes 15/16" O.D. and up. Sherman Soldering Lugs are made only of seamless copper tubing of exactly correct gauge—made for the purpose. Sherman Soldering Lugs are listed as approved by the Underwriters' Laboratories.



Side Formed Lug Patented



Two Hole Lug Patented

Send for Trade Bulletin No. 6
Sold Through Jobbers

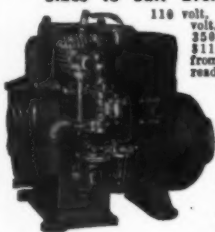
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BATTLE CREEK, MICHIGAN

COMPLETE ELECTRIC PLANTS

ONAN ALTERNATING CURRENT PLANTS supply electricity for Camps, Cottages, Farms, Boats, Commercial Purposes and places where current is not supplied by power companies. Operate Radio, Water System, Refrigerator, all Household Appliances, as well as Public Address and Sound Car Equipment.

Sizes to Suit Every Purpose

110 volt, 60 cycle, A.C.—32 volt, D.C. Capacities 250 watts and up, prices \$110 and up available from stock. Complete, ready to run.



Gasoline, Gas, or Oil Burning types in larger sizes. Write for details.

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Specializing in



ALL THREAD CONDUIT
Made from Enamelled Conduit. Standard sizes in stock—special to order.



GALVANIZED CONDUIT REDUCER

A very useful fitting. All sizes from 4x3½ to 1½ in. Write for complete details and prices.

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Manufacturing & Supply Corp.
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To Cut Thin-Wall Conduit SQUARE Use the Beaver Square-End Sawing Vise



No. 2
1½ to 2"
\$5.00
No. 4
1½ to 4"
\$15.00
No. 2 is aluminum; No. 4 malleable iron. Both are self-contained—and simple to use with a standard hack saw. Renewable inserts. Through your jobber. Write us for complete catalog.

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"Standardize on
STANDARD
Transformers"

ALL TYPES
Indoor and
Outdoor
Service

Send for
Descriptive
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STANDARD TRANSFORMER CO.
Warren - - - - - Ohio

BETTER SOLDERING LUGS



Wolverine Lugs are made from the best electrolytic copper of high conductivity and are processed under the complete control of Wolverine Engineers.

The Square End Design offers greater contact area and increases the current carrying capacity of the lug.

For greater safety use Wolverine Lugs.

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TUBE COMPANY**

1441 Central Ave., Detroit, Mich.
Stocks in All Principal Cities

CLOCK controlled SWITCHES

Ask Headquarters
The TORK CLOCK COMPANY, Inc.
Mount Vernon, New York

This for This



CIRCUIT BREAKER PANEL

There are remodeling jobs to be done in every city. These pictures show the lighting panel—before and after—in the auditorium of one of the largest department stores.* The Chief Engineer gives his reasons for standardizing on Square D switches, panels and motor control:

"Operating a large department store is strongly in the nature of operating a public building. The number of visitors exceeds any but the most unusual public gatherings. The health, convenience and safety of our customers depends on uninterrupted electric service. Switch failure cannot be tolerated. We like the construction and ruggedness of each component part of Square D apparatus.

"Appearance is another important consideration. Our auditorium, seating 1,500 persons, was recently remodeled and we installed Square D circuit breakers and Square D panels for backstage and auditorium lighting.

In the interests of attractiveness and beauty we studied the different types of panels available. Square D stood out in one hundred ways. The modernistic tone fitted into our ideas of decoration."

This story and pictures might help you to sell a similar installation, or—

*Name on request.

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SQUARE D COMPANY

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MICHIGAN WISCONSIN
SQUARE D COMPANY, INC., LOS ANGELES, CALIFORNIA
SQUARE D COMPANY CANADA LTD. TORONTO, ONTARIO



THE G-E RADIAL WIRING CERTIFICATE WILL HELP YOU OBTAIN MORE BUSINESS

Electrical contractors throughout the country are praising the advantages of the new General Electric Radial Wiring System. One contractor calls it, "the best move yet made for the contractor and for the safety of the home owner."

A large number of contractors have answered General Electric's questionnaire about Radial Wiring, and as a result have been awarded en-

graved certificates which state that they are qualified to make Radial Wiring Installations. These certificates are now helping them to obtain profitable wiring jobs.

The certificate will benefit your business. Write today for complete information about the G-E Radial Wiring System, including the questionnaire. Address Dept. C D W - 6 8 3, General Electric Co., Bridgeport, Conn.

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A COMPLETE LINE

G-E BX Armored Cable

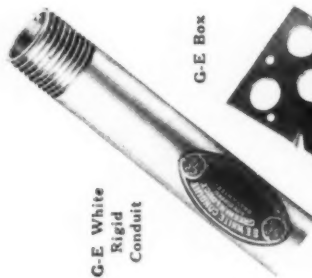
DURABLE AND DEPENDABLE

G-E "Safecote" Building Wire

GENERAL ELECTRIC

WIRING MATERIALS

Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.

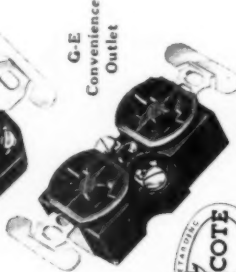


G-E White
Rigid
Conduit

G-E Box



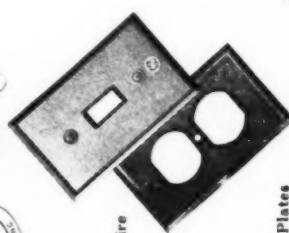
G-E Switch



G-E
Convenience
Outlet



SAFECOTE
BUILDING WIRE



G-E Plates



G-E Fittings

